LARGEST TELEPHONE CIRCULATION IN THE WORLD.

Telephony.

VOLUME VII.
NUMBER 6.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

$1.00 PER YEAR.
10 CENTS A COPY.

COPYRIGHTED, 1904.
ALL RIGHTS RESERVED.

CHICAGO, JUNE, 1904.

PUBLICATION OFFICE:
301-336 MANHATTAN BLDG.

NAGEL ELECTRIC TOLEDO

THE W. G. NAGEL ELECTRIC COMPANY

MANUFACTURERS

"READY" PAY-OUT REELS

520 ADAMS ST. TELEPHONE SPECIALTIES AND SUPPLIES TOLEDO, O.

NAGEL ELECTRIC TOLEDO

E. W. HAMMER, Pres. & Treas. H. J. MUEHLNICK, Sec. & Gen'l Sup't.

The General Engineering Co.

Consulting and Contracting Engineers.

Telephones—Electric Light—Power Transmission.

Suite 1112, 135 Adams Street, CHICAGO.

Long Distance Telephone Central 478.

CHAS. G. STEVENS CO.

BRIGHT COLD ROLLED AND COLD DRAWN

NORWAY IRON, MAGNET STEEL

Cold Drawn Steel: Rounds, Flats, Square, Hexagons.

COLD ROLLED STRIP STEEL

LARGE STOCK ALWAYS ON HAND.

58-60 South Canal Street, CHICAGO

H. M. DEAVITT

Practical and Consulting Chemist

159 La Salle Street, Chicago

Accurate analyses made of Norway Iron, Magnet Steel, Insulating Waxes, Rubber, Cotton, Silk and all material used in electrical manufacture.

Experimental work of every description pertaining to telephone construction.

WRITE FOR OUR COMPLETE CATALOGUE AND PRICES OF

TELEPHONE MATERIAL

DEARBORN ELECTRIC COMPANY

122-124 WEST JACKSON BOULEVARD, CHICAGO

CHICAGO TELEPHONES SATISFY

Crowe Metal Mfg Co. CHICAGO.

WHAT? NAME PLATES

BEST QUALITY — LOWEST PRICE.

New York Insulated Wire Co.

TELEPHONE WIRES AND CABLES

SAN FRANCISCO. BOSTON.
CHICAGO. NEW YORK.

Telephones and Accessories Bought, Sold and Exchanged

CHICAGO TELEPHONE APPARATUS EXCHANGE

17 S. Elizabeth St., Chicago.

MATHIAS KLEIN & SONS,

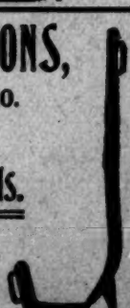
83 W. VAN BUREN ST., CHICAGO.

MANUFACTURERS OF

Linemen's Construction Tools.

WRITE TO-DAY FOR OUR

"RED BOOK" It is of pertinent interest to every telephone man and will be sent free upon request.



JONES & WINTER

INDEPENDENT

Telephone Engineers and Contractors

1259 Monadnock Bldg., CHICAGO, ILL.

WRITE FOR OUR REFERENCES

M. B. AUSTIN & CO.

56-58 West Van Buren St., Chicago.

THE TELEPHONE SUPPLY HOUSE

STANDARD SUPPLIES.
LOW PRICES. PROMPT SHIPMENTS.

Write to-day for Catalogue and Prices.

McROY CONDUITS—BRAZIL, INDIANA

CONDUITS RIGHT. PRICES RIGHT.

Our Conduits Manufactured at
Brazil, Ind. and in Ohio, Pennsylvania and New Jersey.
PROMPT DELIVERIES AND THE HIGHEST GRADE OF CONDUITS.
Write or Telephone your requirements and we will submit samples and prices.
Address
F. B. BADT & CO., Monadnock Block, Chicago, Ill.

The Indiana Rubber & Insulated Wire Co.

Manufacturers of
Insulated Wires and Cables

PARANITE TRADE MARK

JONESBORO, : IND.

THE H. B. CAMP CO.

Manufacturers of
"CAMP" STANDARD VITRIFIED CLAY CONDUITS.

SALES OFFICES:
85 Hartford Bldg. CHICAGO
170 Broadway NEW YORK

TELEPHONE SUPPLIES
INSULATORS
CROSS ARMS
BRACKETS
PINS
BATTERIES
WIRE, ETC.
RUSH SHIPMENTS. LOW PRICES. TRY US.
WRITE FOR CATALOGUE
HODGE-WALSH ELEC. ENGR. CO.
701 Delaware Street KANSAS CITY, MO.

Alphabetical Index to Advertisers

Acme Electric Co. 18
Advance Electric Co. 46
American Carbon & Battery Co. 20
American Conduit Co. 38
American Electric Fuse Co. ..12-39
American Elec. Tele. Co. 41-100
American Electric Works 100
American Machine Telo. Co. 31
Andrae Sons Co., The Julius.. 38
Austin, M. B. & Co. 1
Automatic Electric Co. 16-17

Baird Mfg. Co. 24
Barry & Benton 94
Beidler & Co., Francis. 94
Benedict & Burnham B. & C. Co. 100
B. R. Elec. & Telo. Mfg. Co... 99
Bissell Co., F. 14
Bowersock, Fred H. 46
Brooks, Hall L. 88
Butterfield, J. F. 100

Camp Co., H. B. 2
Carney Bros. Co. 87
Central Electric Co. 22
Central Telo. & Electric Co. 18
Chicago Fuse Wire & Manufacturing Co. 97
Chicago Telo. Apparatus Exchange 1
Chicago Telo. Supply Co. 1-3-5
Chicago Insulated Wire Co. 100
Chicago Writing Machine Co.. 10
Clark Wireless T.-T. Co., Thos. R. 22
Clement, Edward E. 46
Commercial Elec. Supply Co.. 8
Century Telo. & Const. Co. 28
Conover, Geo. W. 100
Controller Co. of America. 23
Cook, F. B. 13
Coolidge Co., Marshall H. 86
Crowe Metal Mfg. Co. 1
Crumb & Co., W. H. 100
Current Electric Co. 30

Dearborn Electric Co. 1
Deavitt, H. M. 1
Doubleday-Hill Electric Co. 22

Electric Appliance Co. 7
Electric Gas Lighting Co. 99
Eureka Electric Co. 29-46
Ewing-Merkle Electric Co. 28

Faller Automatic Tel. Ex. Co.. 83
Farr Telephone & Construction Supply Co. 26
Fibre Conduit Co. 100
Field, C. J. 2
Fowler, John H. 94

General Engineering Co. 1
Greenbrier Pole Co. 92
Guarantee Telo. & Equipment Co. 30

Hallett Iron Works 40
Harvard Electric Co. 46
Hemingray Glass Co. 20
Hodge-Walsh Elec. Engr. Co. 2
Holt Lumber Co. 86
Holtzer-Cabot Elec. Co. 30
Huebel Co., C. J. 91

Illinois Electric Co. 11
Illinois Electric Specialty Co... 26
Indiana Rubber & Ins. Wire Co. 2
Indiana Steel & Wire Co. 97
International Creosoting & Construction Co. 93
International Telephone Manufacturing Co. 100

Jones & Winter 1

Kellogg Switchboard & Supply Co. 42-43-93
Klein & Sons, Mathias. 1
Klipstein & Co., A. 100
Kokomo Telo. & Elec. Mfg. Co. 4

Lindsley Bros. Co. 84

Macomber & Whyte Co. 97
Matthews & Bro., W. N. 93
McRoy Clay Works 1
Meilink Mfg. Co. 6
Middleton & Co., J. W. 100
Miller Anchor Co. 14
Monarch Electric & Wire Co.. 8
Monarch Telephone Mfg. Co... 21
Moon Manufacturing Co. 20
Mountain State Electrical Co.. 38
Mueller Company, Wm. 85
Murdock & Co., W. J. 99

Nagel Elec. Co., W. G. 1-40
Nash & Co., Geo. 94
National Wire Corporation. 96
Naugle Tie Co., E. E. 88
New Haven Novelty Machine Co. 96
N. Y. Insulated Wire Co. 1
North Electric Co. 25

Pendleton & Gilkey 90
Perrizo & Sons 89
Pittsburg & Lake Superior Iron Co. 87
Plume & Atwood 99
Pontiac Engraving Co. 38

Raber & Watson 85
Roebling & Sons Co., John A.. 95
Rogers, Oscar Wentworth. 32-33-34-35

Sand Point Cedar Co. 89
Scoville Manufacturing Co. 99
Spies Electric Co. 46
Standard Telo. & Electric Co.. 19
Standard Underg'd Cable Co. 46-98
Stanton, L. W. 36-100
Sterling Electric Co. 44-45
Sterling & Son, W. C. 94
Stevens Co., Charles G. 1
Stromberg - Carlson Telephone Manufacturing Co. 27
Swedish-American Tele. Co. 9

Taylor, Lee J. 95

Veeder Mfg. Co. 24
Vought-Berger Co. 15

Want Advertisements 95
Warner Electric Co. 6
Waterbury & Co. 99
Wesco Supply Co. 46
Western Electric Co. 92
Western Telephone Mfg. Co. 37
Wheeler Electric Const. Co. 100
Williams-Abbott Elec. Co. 10
Williams Telo. & Supply Co. 4
Wittenberg Cedar Co. 91
Worcester Co., C. H. 84
Wright Bros. 90

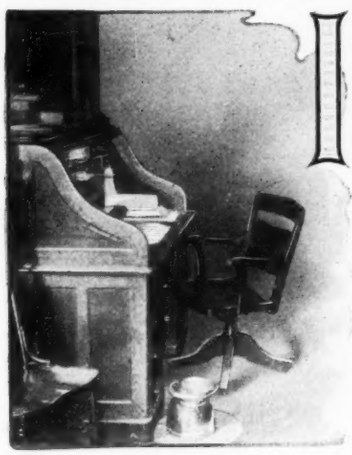
Yesbera Mfg. Co. 24

Telephony.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

VOL. VII. CHICAGO, JUNE, 1904. No. 6.

MODEL OHIO SYSTEM



IN THE city of Springfield, Ohio, a model telephone plant has been completed. The system has been constructed in the most up-to-date manner, no expense being spared which would in any way increase the efficiency of the service or lower the cost of maintenance. The management cannot be too highly praised, and the operation is as nearly perfect as can be had.

Springfield is located in the center of the garden spot of Ohio, and has a population of 45,000, and the Home Telephone Company is at present giving service to about 2,000 of this number. The exchange was opened on February 1, 1904, with 600 subscribers' lines connected to the switchboard. Since that date, telephones have been put in service as rapidly as possible. During February, 364 new contracts were signed. March and April followed with 620 for the two months. The company is behind in the work of installing instruments, but expects to catch up with its contract department within the next few weeks, as it has been compelled to add to its force of men putting in instruments. The switchboard has an ultimate capacity of 7,200 lines, and an installed capacity of 3,300 lines, which will be exceeded within a year, if the company continues to do business at even half the rate it is at present. The telephone situation in Springfield has a very pleasing outlook, and those connected with the enterprise predict a success as great, or greater, than any other telephone plant in the country has achieved.

Main Entrance to Building.

Before the entrance of the Springfield-Xenia Telephone Company into the field, the Central Union, or Bell Telephone Company, of course, had an exclusive monopoly which was used to the fullest extent, taking the money of the public and giving service which seemed to change with the weather and the disposition of the management. This was the condition when C. D. Juvenal went before the city council to secure a franchise to build the present plant. The passing of the franchise was fought to the end, but it was a case of the people against a corporation which had not attempted to give them value received for their money, and the people won, as they always do in such cases.

Active construction of the system began in February, 1903, and the work was pushed to the utmost until completion. The work is practically all finished within the city limits, but it is the company's intention to build at least 200 miles of lines radiating in every direction from Springfield, and it expects to have 500 farmers' telephones working before the first of the year. All of the material for these lines is on the ground, including 3,000 poles. About sixty miles of lines have already been completed.

The standard for the country work is being kept as high as for the city, nothing but galvanized material being used, and the service furnished the farmer will be the best that good apparatus and construction can give. The farmers' situation in the territory lying adjacent to Springfield will undoubtedly reach enormous proportions within the next year, and the Springfield-Xenia Telephone Company has made arrangements to take care of the lines on a switchboard especially constructed for that purpose. At the present time it is not in-

Pole Lead.

Underground Conduit Construction.

stalled, but it is expected that it will be shipped from the factory within the next few weeks. This switchboard is one section of three positions with an ultimate capacity large enough to take care of the business for years to come and is of a new type, being a lamp line magneto board with lamp supervision on the cords. The contract was awarded to the Sterling Electric Company of Lafayette, Indiana.

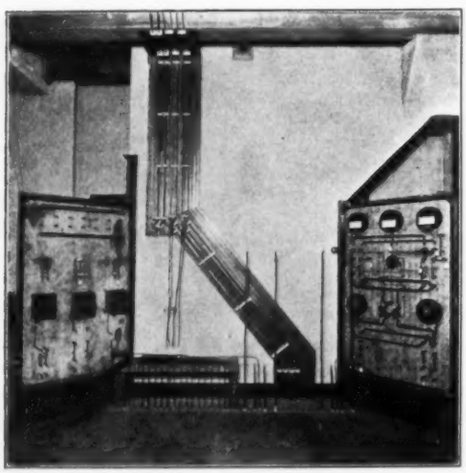
The writer would like to give a comparative statement, showing the number of stations operated by the Home and Bell companies in Springfield, with the different rates, but after a brief investigation, it was found that *the Bell Company has at least twenty-seven different rates for about six grades of service furnished, outside of a large free list.* This makes it impossible to even approximate the number of their bona fide subscribers, or what they are paying. Several cases could be cited of parties having adjoining offices in the same building and both receiving the same "main line" service, where one of them pays anywhere from $1 to $2 per month more than the other. These conditions have made possible the phenomenal success of the Home company.

Seventy-five per cent of the money spent to build the Home plant was furnished by local parties, making it in truth a home company. The officers of the company are as follows: President, Ed. L. Barber; vice president, S. F. McGrew; treasurer, J. F. McGrew; secretary and general manager, C. D. Juvenal.

Directors—J. L. Bushnell, S. F. McGrew, P. E. Montanus, E. L. Barber, J. F. McGrew, R. R. Mills, N. I. Dryfoos, J. M. Blatt, J. B. McGrew, C. D. Juvenal, W. C. Polk.

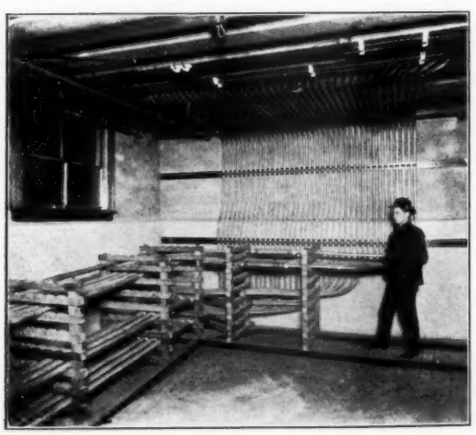
There are over fifty local stockholders, among whom may be mentioned the following: J. L. Bushnell, Chandler Robbins, J. F. McGrew, Emerson Gard, Chas. S. Kay, A. Winger, P. E. Montanus, Judge F. M. Hagan, E. O. Hagan, Dr. Dimond, S. F. McGrew, R. R. Mills, J. B. McGrew, Paul A. Staley, W. F. Schause, A. K. Hahn, W. W. Witmeyer, E. P. Holman, E. C. Gwyns, Walter Holeman, C. G. Heckert, John H. Miller, Jane Carr, M. F. Potter.

Ed L. Barber.

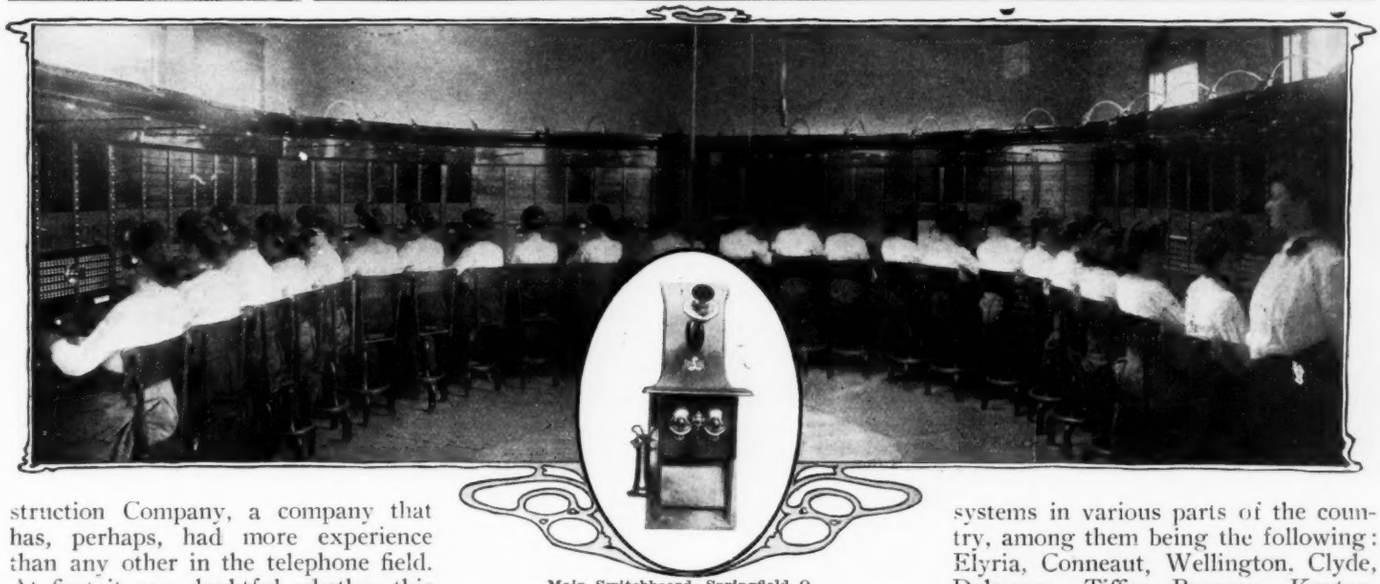


Rear View of Power Boards.

The above gentlemen have done much toward promoting the success of the company, and too much cannot be said for the tireless energy, careful management and executive ability of the secretary and general manager, C. D. Juvenal. It was he, who, after receiving the franchise, interested capital and was the means of placing the construction in the hands of the Central Con-



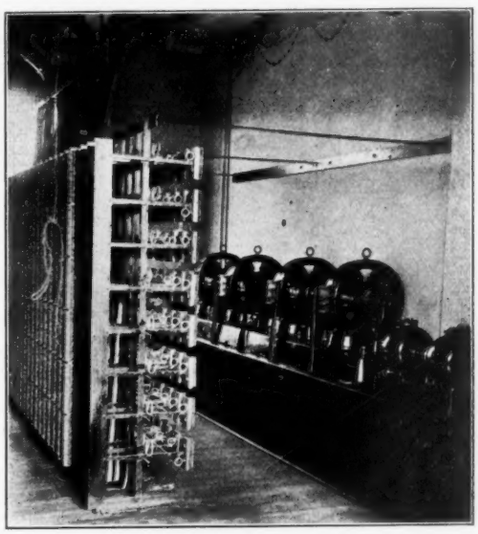
Cable Terminals.



Main Switchboard, Springfield O.

struction Company, a company that has, perhaps, had more experience than any other in the telephone field. At first it was doubtful whether this concern could be induced to take hold of the work, as it was at that time building an exchange in Kansas City, Missouri, and finishing plants at Louisville, Kentucky, Toledo, Ohio, and Utica, New York, but the Home management was finally successful in closing a satisfactory deal with the company.

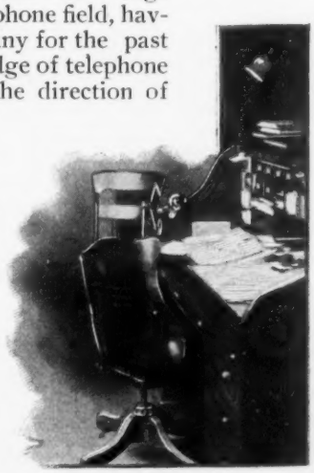
The Central Construction Company, of which James S. Brailey, Jr., is manager, commenced business in a small way in 1896, constructing small telephone plants in the spring of that year, and has continued in the business of constructing telephone plants since that time, meeting with great success. The company has constructed over fifty different systems in various parts of the country, among them being the following: Elyria, Conneaut, Wellington, Clyde, Delaware, Tiffin, Bucyrus, Kenton, Piqua, Troy, Sidney, London and Springfield, Ohio; Richmond, Elkhart and Goshen, Indiana; Lexington and Louisville, Kentucky; Utica, Rome and Herkimer, New York; Kansas City, Mo., and Toledo, Ohio. The company has been a partnership up to the present time, but has now incorporated under the name of the Central Telephone Construction Company. The incorporation does not change the business in any way, except from a partnership to an incorporated company, as all of the stock is owned in the company.



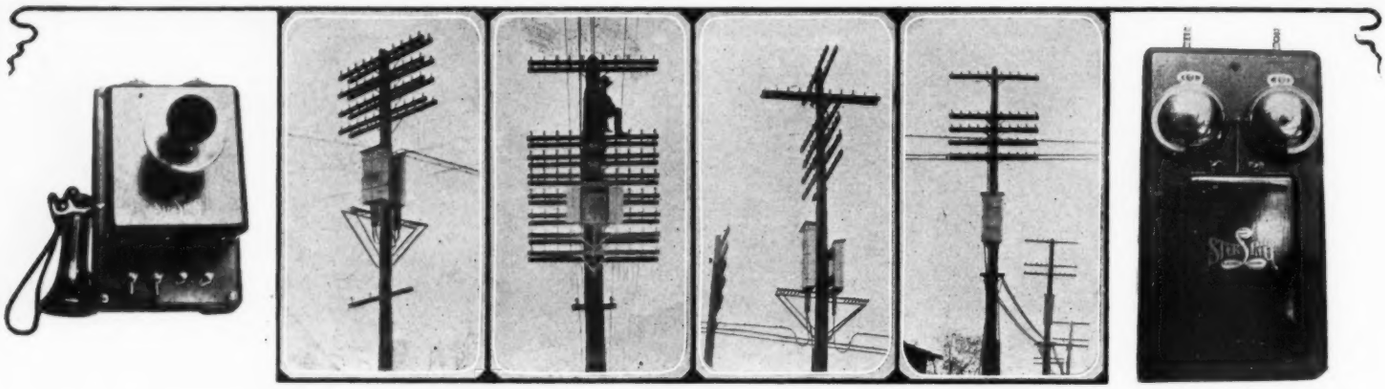
Line Side of Terminal Rack and Machines.

J. S. Brailey.

The construction of the system was under the immediate supervision of William M. Bruce, Jr., assistant engineer of the Central Construction Company. Mr. Bruce is a young man who has had a large amount of experience in the telephone field, having been with the Central Company for the past four years. His practical knowledge of telephone engineering was gained under the direction of one of the best known telephone engineers of the day, W. C. Polk, chief engineer of the Central Construction Company, who for the past two years has been located in Kansas City. Among those in charge of the construction work may be mentioned Bert Dye, superintendent of construction, Fred Fraser, superintendent of cable work, and H. J. Jeffery, chief installer of the Sterling Electric Company.



Mr. Dye is an old Bell tele-



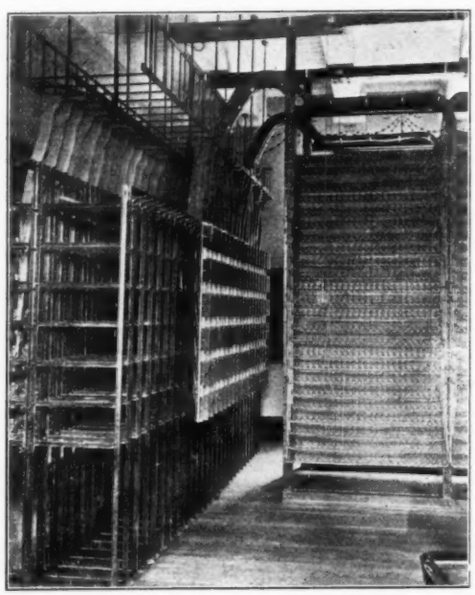
Cable Pole Construction.

phone man, having been with the Central Union Telephone Company in Ohio and Michigan prior to his entrance into the Independent field six years ago. He is probably as well known as any man in the construction business to-day.

Mr. Fraser is also an old Bell telephone man, having worked for the Western Electric Company in many states. He has been with the Central Construction Company for the past three years.

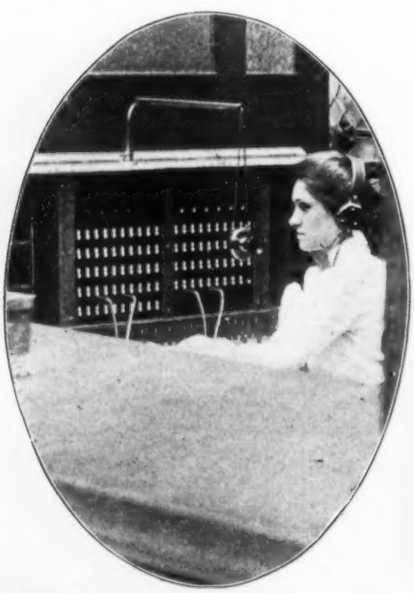
Mr. Jeffries, chief installer of the Sterling Electric Company, has given to the Home company at Springfield a job that is neat, workmanlike, and perfect in every detail. Owing to the careful manner in which this switchboard has been installed, the Home company expects to have no future trouble with it.

Much thought was given to the location of the central office, and after viewing many sites, one was decided upon which lay in the heart of the city, which also brought it within the center of distribution, from a telephone standpoint. The lot purchased was 60x150 feet. Along one side is an alley, making entrance possible for teams to the rear of the lot, where a large tool house, 60x20 feet, was erected for the accommodation of heavy linework construction materials. On the front of the lot, and taking in its whole width of sixty feet, the central office was erected. It is a three-story brick structure, with large, light cellar, built entirely of standard mill construction with iron columns and girders, and thoroughly insulated with a sheath of cement. The front is of pressed brick and the building is a model one for telephone purposes. The architects were Drach & Miller of Springfield, Ohio. In the rear of the building, between it and the tool house, is a large yard, 50x60 feet, which is used for the accommodation of the wagons belonging to the company and such material as can be exposed to the elements. The Home company has connections over the lines of the United States Telephone Company with all of the points reached by that system. In addition to these it has built lines of its own to all the towns of any size within a radius of twenty-five miles. A special long distance switchboard has been provided to take care of these lines. It is a two-section, four-position board with room provided between the operators for a calculagraph. This board has an ultimate capacity of eighty toll lines and an installed capacity of forty toll lines.



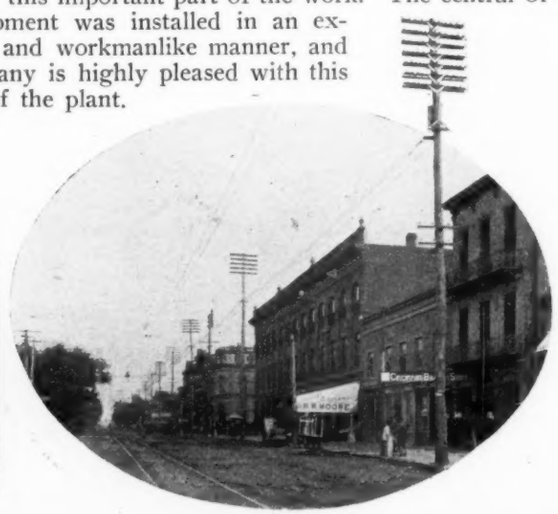
Relay and Intermediate Racks.

The central office equipment is up-to-date and complete in every particular, switchboard and all other apparatus being of the very latest and most approved type of modern construction, selected from the standpoint of general excellence and durability. The selection was not made until the field had been thoroughly canvassed by the Home company, when a contract was closed with the Sterling Electric Company of Lafayette, Indiana, for this important part of the work. The central office equipment was installed in an expeditious and workmanlike manner, and the company is highly pleased with this feature of the plant.



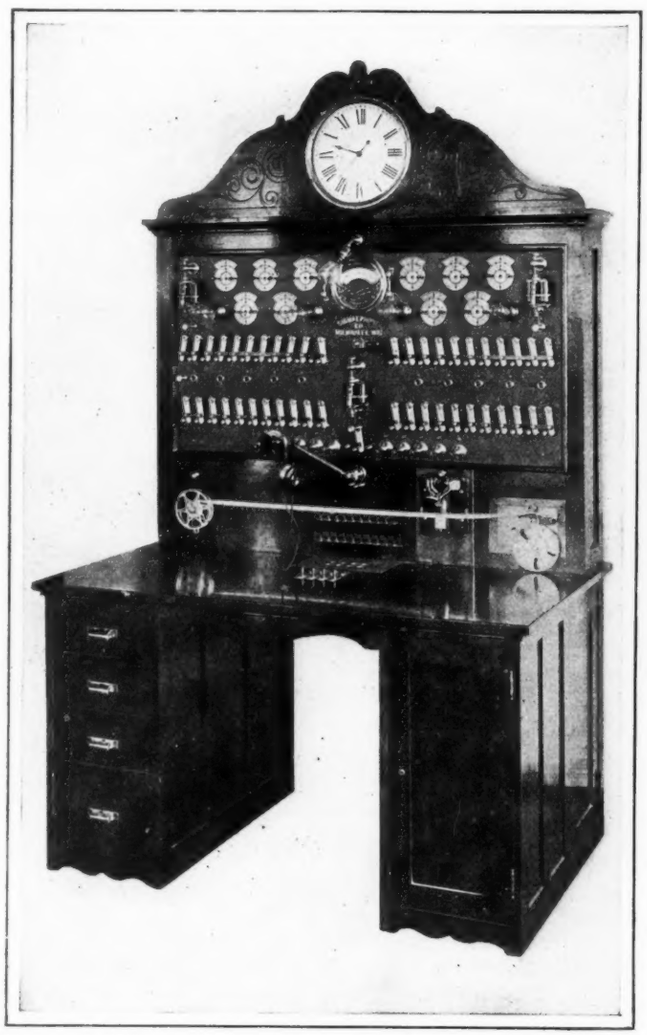
Private Branch Switchboard in Bookwalter Hotel.

Rear Yard and Tool House.



Pole Lead.

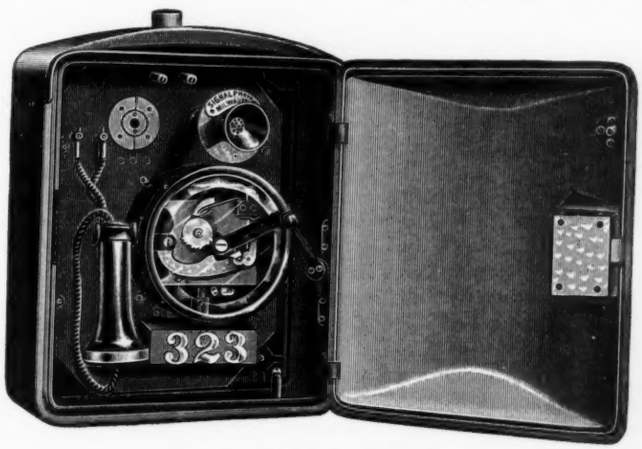
The outside construction was planned and executed on a very broad and comprehensive scale, with one point always in view, that of future maintenance. The equipment at the present time is sufficient to take care of the growth for some time to come, and has been so arranged that extensions may be added at any point from time to time, without disturbing existing conditions, thus materially decreasing the cost of enlarging the plant when necessity requires. A large amount of cable has been used in this work, both underground and aerial, there being about 50,000 feet of underground and about 240,000 feet of aerial cable. The underground cable is all 200-pair, and the aerial ranges in size



Police Signalphone Switchboard.

from 150 to twenty-five pairs. Very little twenty-five pair cable was used, there being less than 10,000 feet in the entire system. Multiple distribution was followed and the cable plant was planned to be as flexible as possible, giving a great amount of latitude with a view to future extensions and development. Outside of the drops to the subscribers' houses, very little open wire has been used. Such a large number of cable boxes have been provided (there being two hundred and fifty-four) that most of the subscribers can be reached from the cable pole itself. These cable boxes were made locally of the best grade of white pine, the sides and top being of inch and one-half stuff, while the backs are made of seven-eighths inch material. The top was covered with a sheath of galvanized iron, and the box made as water tight as possible. In addition to this all of the boxes were treated on the inside with three coats of fireproof paint. On all the cables entering these boxes, potheads of rubber covered wire were made, and the form laced and soldered to terminal strips placed in the center of the box. On either side of these strips was placed the cable protection. Much money has been spent on this protection. The company after having made many experiments with different apparatus, together with its experience gained in other localities, finally purchased all of its protection from the Sterling Electric Company, and each line that is bridled in a cable box is protected by a tubular fuse with carbon and mica ground plate. These fuses are somewhat of a novelty and do not require a man with a monkey-wrench and a pair of gas pliers to remove and replace them as has been the case heretofore, but are held in place by a spring contact, which is really more positive than the old method. The Home company has spent several thousand dollars on this protection, but expects to reap a great benefit from it. In fact, up to the present time, it has saved them considerable time and expense.

All of the underground work was done in the best possible manner, vitrified clay conduit being used throughout, great care being taken to have each duct true and straight, so that no obstruction would be met by the cable. The con-



Police Signalphone Box, Open.

duit was laid by experienced men and a good grade of cement was used, J. M. Blatt being directly in charge of this work. At all intersecting alleys and streets, where necessary, manholes were provided, these manholes being built of brick and of ample size to permit the cable work to be done with the least possible inconvenience. The manhole covers are the same as those used by the Central Construction Company in other cities, having a hinged cover serving as a protection to the man working below.

All the attention possible has been given to this outside work, especially the handling of the cable, and up to the present time no flaws have appeared whatever. All of the underground and part of the aerial cable was furnished by the John A. Roebling Sons Company of Trenton, N. J. The balance of the aerial cable was furnished by the American Electric Cable Works of Phillipsdale, Rhode Island.

The conduit system contains 100,000 duct feet, or twenty miles, and required 15,000 feet of trench excavation. There are thirty-five manholes, and forty-eight continuous ducts are run from the building and distributed throughout the city. There are only nineteen of these ducts now used, with nineteen cables of 200 pairs each, making 3,800 wires in the initial installation, making it possible without further additions to connect 3,800 main line telephones. This leaves twenty-nine ducts unoccupied for future extension. Over 1,000 miles of copper wire has been used within the city limits, and already 500 miles of wire has been used for country and toll lines in the county. The 3,000 poles, in length from thirty to sixty-five feet each, are all painted green, which is a decided relief to the citizens of Springfield, and

the company has received many compliments for introducing this innovation in pole painting.

The company owns and controls exchanges in Green County, at Xenia, Jamestown, Yellow Springs, and Bowersville, and has in operation 1,300 telephones and 125 miles of toll and farmer lines. The business men of Springfield do not yet realize the extent of the present enterprise and its advantages to Springfield, from a commercial point of view. Springfield is the center of a prosperous country, with thriving towns on all sides, which are now being served with Independent telephones which in turn have been connected to Columbus, and the merchants of Urbana, Mechanicsburg, London, Piqua, Troy, Xenia and many other towns, have been sending orders for their goods to Columbus. When the people of Springfield realize that they are connected to 1,250 telephones in Urbana and 700 in and about Mechanicsburg, they will more fully understand the amount of business that is bound to flow to the Springfield merchants by reason of these connections.

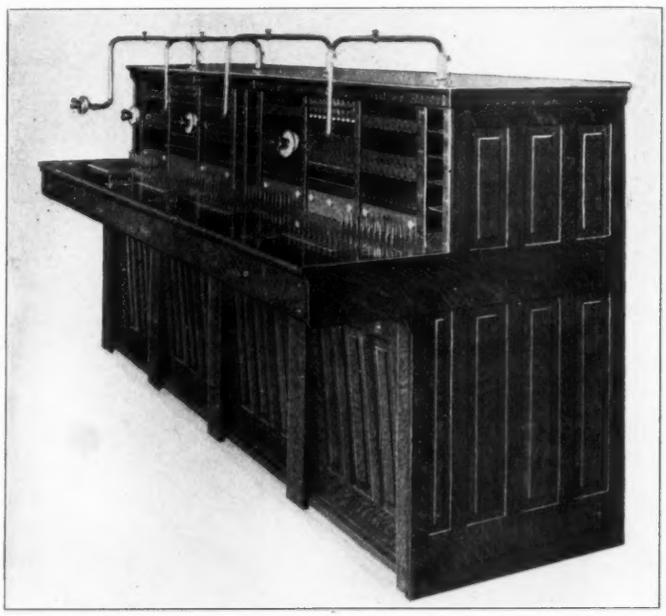
The Home company has a large number of common battery private branch exchanges in operation at the present time, one of which is a 100-line board located in the new Bookwalter hotel, connection being had with all of the rooms in the building. Jacks were placed around the walls of the dining room and a portable set provided so that guests could, if they so desired, use the telephone while at meals. Another board was installed in the new Wren department store, a six-story building covering a large portion of a city block. Other boards were installed in several of the large greenhouses. These systems required quite a large amount of outside work, as their buildings cover acres of ground. In addition to this the Home company has installed a complete police signal system for the city of Springfield, forty boxes having been placed at various points and a most complete lamp line switchboard located at police headquarters. This system is a common battery metallic one, and is provided with a duplicate set of storage batteries, each set containing sixteen cells. The switchboard was purchased from the Signalphone Company of Milwaukee, Wisconsin, and is one of which the people of Springfield should be proud. One of the novel features contained in this board is the telephone apparatus, which was placed in addition to the police signal system. A complete set of cords and plugs was provided and by means of these the operator at headquarters can connect any box in the city with the main switchboard of the Home company, thus making it possible for the chief of police, or any one in authority, to direct the men from any point they wish.

The finances of the company are on the following basis: It has a capital stock of $750,000 of five per cent twenty-year gold bonds. Four hundred and fifty thousand dollars of the common stock and $450,000 of the bonds have been issued. Of the total bond issue, $300,000 is retained by a trust company as treasury bonds, to be sold for the extensions and additions to the plant. The bonds draw interest from January 1, 1904, the interest being payable semi-annually. These securities have been taken largely by local capitalists and there is every indication from the very flattering patronage given the company, that a substantial return on the investment will be fully realized. This capitalization includes telephone plants in Xenia City, Yellow Springs, Jamestown and Bowersville, which have been in operation for a year or more.

As a somewhat technical description of the Springfield exchange cannot fail to be of interest a brief outline of the apparatus installed is here given:

The exchange is a full common battery system of the most modern type, comprising not only the main switchboard itself, but including all of the necessary equipment in the line of special apparatus for quickly and economically handling toll calls and all of the special classes of service required in an up-to-date telephone exchange. The underground cables enter the building through conduits terminating in the basement of the exchange, and passing through the basement ceiling terminate on the main distributing frame. This frame is of angle iron of the well-known Sterling company's design, and is equipped with their standard heat coil and carbon arrester protection. The frame has an ultimate capacity on the switchboard side for 7,200 metallic subscribers' lines and is provided in addition with several uprights of protectors for toll lines and other special circuits. The capacity of the frame on its line cable side is forty per cent in excess of the switchboard side. From the main distributing frame the lines pass to the relay racks, which are constructed in racks of two bays each and on which are mounted all of the relays of the system, there being, contrary to common practice, no relays associated with the cord circuits of the switchboard and, therefore, no necessity for mounting any relays in the switchboard itself.

The battery for operating the entire system is fed in at the relays and each bay is provided with heavy copper bus bars, from which fuses are extended to the fuse posts on



Toll Switchboard, Springfield System.

each relay plate, thus providing each twenty-five lines of the system with separate fuses.

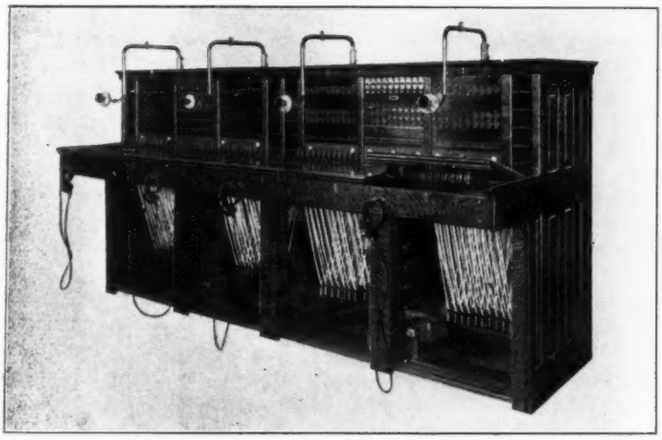
From the relays the lines are extended to the multiple side of the intermediate distributing frame, an arrangement which has the great advantage of permanently associating a given relay with its line, so that after a relay is once adjusted for operation on its line no further attention is required, as the cross connection of the line to any desired answering jack does not change the relay of that line; it only associates some other answering jack and lamp signal with the line relay.

The intermediate frame is of angle iron construction with vertical and horizontal runways for greater convenience in running cross-connecting wires. It has an ultimate capacity of 7,200 metallic lines and provides, in addition, ample capacity for all trunk, desk and other auxiliary circuits. On the multiple side the lines are arranged in numerical sequence; on the answering jack side each upright includes the lines of one operator's position, having a capacity of 140 lines to each upright. From the intermediate frame all lines are carried in iron runways on the ceiling to the point where they pass through into the cable turning section of the main switchboard on the floor above, and from there the answering jack cables go to their proper locations in a running box in the bottom of the switchboard, the multiple cables to their supporting shelf running around the board and the desk

cables through their special conduits to their proper locations.

All of the cables used in the entire installation, except where they are in the main switchboard, are supported in iron runways hung from the ceiling. The cables themselves are of No. 22 B. & L. guage tinned copper, each conductor being insulated with silk and cotton and encased in a fireproof braided covering, every known precaution having been adopted to guard against damage from fire or water.

The main switchboard is a common battery, lamp signal, multiple switchboard of nine sections of three operators' positions each. The multiple is a six-panel multiple, having an ultimate capacity of 7,200 multiple jacks, there being at present installed, multiple for 2,400 lines. As the board is



Front view of Toll Switchboard, showing construction.

of "horseshoe" form there are of course a number of turns in the multiple, and to avoid one of the two usual bad features at this turn, either a blank space between two panels of multiple, thus increasing the normal reach, or the very objectionable feature of shortening the keyboards of these positions, thus crowding the operators, the turn is made on the front of the keyboards and the angle so proportioned between the sections as to take a panel of multiple, thus avoiding the objectionable features above mentioned and showing an unbroken multiple around the board.

The first and last positions of the board are without operators' equipment and serve as a multiple annex. The second position of the board is equipped as an incoming trunk position and the regular subscribers' operators' positions begin at the third position. All multiple jacks are of the bridging type, mounted twenty-five per strip on three-eighths inch centers; each group of 100 is separated by a white holly strip and further designated by a number on the number casings. In the space between the multiple and answering jacks is room for mounting an ultimate capacity of 150 outgoing trunk jacks in each section, there being at present fifty trunks which are multipled through each section of the switchboard. These trunks are divided between the different desks and the toll board.

Each regular operator's position has a capacity of 140 answering jacks and line lamp signals, the present equipment being for 100 lines. Each position is also provided with the usual pilot lamps, which work in unison with the individual signals of that position, and associated with these pilots is a night alarm circuit. Each position is equipped with fifteen complete cord circuits, having double supervisory lamp signals and the necessary operators' keys. The line lamp signals are mounted in strips of ten each on one inch centers, each lamp being directly above its aswering jack and is provided with an interchangeable number desk. Any line lamp, as well as any other lamp signal in the switchboard, is mounted so that it can be removed or inspected without disturbing any other signal.

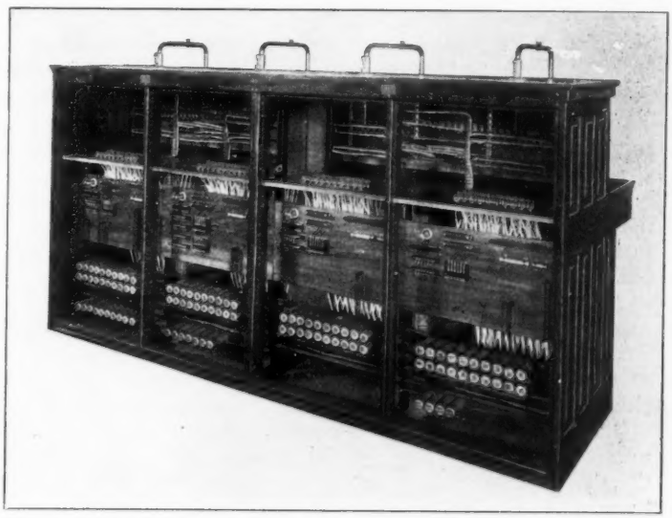
The incoming trunk operators' positions are equipped for twenty-five trunks terminating on cords and plugs, each trunk being provided with a disconnect signal. The trunk operator cannot ring or listen in on the circuits and receives but the one signal, thus avoiding any interference with toll conversations or any confusion of signals. The toll operators have supervision and absolute control of the connection.

The rear of the entire switchboard is remarkable for the simplicity of its connections and the lack of apparatus. In the switchboard, other than the switchboard cables and cord fasteners, there is no equipment whatever except the ringing and battery lead and the coils associated with the operator's set, and it is, therefore, never necessary to get into the switchboard for the purpose of relay adjustment, as in other systems.

Located in the operating room are the chief operator's, information operator's and monitor's desk. The latter is provided with listening-in jacks for each operator's set and with each jack is associated a pilot lamp, which lights in unison with the pilot lamp of the corresponding position. The chief operator's and information operator's desks are flat-topped, each provided with trunks to and from the main switchboard. All connections at these desks are effected by using cams instead of cords and plugs and all signals on these desks are lamp signals, automatic in action. In the terminal room is located a wire chief's desk of elaborate design as to apparatus and circuits; it is provided with extremely sensitive testing apparatus and with the necessary talking and testing trunks to all parts of the exchange system.

All of the apparatus furnished throughout this exchange is mounted in oak cabinet work of the most carefully selected figure and of the highest finish and the workmanship of every part of the entire system is of the same high grade.

The power plant consists of two sets of storage batteries, placed in the battery room in the basement of the exchange



Rear View of Toll Switchboard, showing construction.

building. Each set of eleven cells has sufficient current capacity to operate the entire system for thirty-six hours. The balance of the power plant is in the terminal room, and consists of two motor-generator charging sets of Holtzer-Cabot motors, coupled direct to Holtzer-Cabot special noiseless telephone charging dynamos. The ringing machines, two in number, are of the same type and manufacture, one of them being designed to be driven from the exchange storage battery. The power board for controlling this apparatus is of black slate and is fully equipped with the highest grade switches, circuit breakers and indicating instruments.

In a room adjacent to the main operating room is located

the toll switchboard, which, with all the rest of the exchange apparatus, was manufactured by the Sterling Electric Company. It is an elaborate four-position switchboard, with special toll line drops of the cut off relay type. There are at present installed forty toll line equipments, but wired for eighty, the toll lines being multipled through each section. Service trunks to the number of ten are multipled through each section, and an equipment of ten recording trunks is also provided. Each position is provided with ten-cord circuits, of which five are adapted for toll to local connections, and all cord circuits are provided with three cams for the usual purposes. All classes of signals are provided with special pilot signals, all of which can operate a night alarm if necessary. Arrangement is also made so that by means of switches all toll lines terminating on the last two positions can be thrown onto the first two positions at any time, if desired. This switchboard is self-contained, in that all the apparatus used in its operation is mounted in the cabinet of the switchboard itself.

THE PATIENT, FASCINATING "HELLO GIRL."

"Hello! Number, please. Talking now."

The central girl punctuated her remarks with the steady click, click of the "plugs." Other drops on the board fell in rapid succession and the girl's voice repeated over and over again, "Number, please." "Number," "Number, please."

Then for a moment the rattle of falling drops on her board ceased and she sighed just faintly and leaned back in her chair with her hands resting in her lap. Then she straightened up and pressed a switch.

"Hello—Hello-o-o—talking. All right."

Then she sank back into the chair again.

"Busy day," she said softly. "That party line is out of order; it makes me so mad."

A drop fell and she answered the call. Her fingers deftly adjusted a "plug" and she had another moment to think.

"It is monotonous sometimes, yes—but then, we get 'usted' to it; we have to, or we'd go crazy sometimes. I've been on this board a year almost—(Number—there you are—why don't you answer—they're trying to talk to you.)" The "plug" fell back upon the board with rather a menacing rattle, and the central girl's face wore a frown. It vanished almost instantly and she smiled again.

"You have to be a born central girl, I guess; you can't make an operator out of some girls in years. I'm not as fast as some girls when it comes to handling a 'busy board,' but I know how to control my temper. That's just half in the making of a central girl. Of course, sometimes I get mad—every one does, I guess—but we learn to forget. Trouble isn't real as a rule, if you don't think so—we sort of use Christian science," she added, laughing. A broadside of "drops" fell with an angry clatter.

"Number—number, please—talking now—yes, talking—number—that line isn't working—yes, of course I'll ring them, but it won't do any good—number—sure, you can have any number; yes—yes—number." The expression on the central girl's face changed with each call she answered. Sometimes she smiled as though meeting a friend; then a frown made tiny wrinkles on her forehead. Again she assumed a business-like air in keeping with the tone of the voice at the other end of the line.

"If we were to let our little tempers run away every time we had a cause what an awful mess it would make. Sometimes it's bad enough without central making a full—plenty of that at the other end of the line."

The girl giggled quietly as she swung the transmitter to her lips and said again:

"Number, please—number—that line is busy now."

A dainty bit of lace—a handkerchief—lay on the board. The girl picked it up and passed it lightly over her face.

"My powder rag," she exclaimed, giggling again. "This is a good place to study people, even though you can't see them. I know every one on by board just by the way they ring in—lots of little things help you to find them out. You can just tell when they are in a hurry by the way they jerk the receiver off and joggle the hook. There's one now. That's a doctor ringing there, and he's in a hurry about something."

"Number, please," she said quickly.

"Some people stand back from the transmitter and talk in a low voice. Of course I never saw them, but I know just how they do it.

"Number? Number, please—there you are—talking—Number?

"I never listen on the lines; it isn't good manners."

The girl giggled softly.

"Oh, sometimes it's necessary—just to see if they're through talking."

She slipped the receiver from her ear.

"Listen there just a second. That woman's making all that fuss just because that butcher sent some meat up late. That's her line right over there—last one on the top. I can tell just the way she rings in if some one's going to get called down. Then she always snaps at me, like this: 'Central, what's the matter to-day? I've been trying to get you for an hour.'

"I always answer like this: 'I'm awfully sorry, Mrs. Brown; must have been something wrong on the line.' Then I give her the number she wants. It flatters her to call her by name. She thinks she's the only one on the whole board that I know; I know 'em all! But that butcher——"

The girl laughed softly as a drop fell.

"Number, please?" she asked. "He gets more roasts than any one I know; honestly, I get sorry for him sometimes. There's an old woman that rings up every day almost and calls him down. One day I knew by the way she rang in and spoke to me that she was worse than usual. I rang the butcher first and told him she was mad. Then I plugged in the woman and listened on the line—yes, in a case like that we sometimes do; it's fun. The butcher had sent the clerk to the telephone and I heard the clerk tell that woman the butcher wasn't there. It was a lie, but I didn't blame them."

"Number, please? Number ———? Number, please?"

"Yes; it may seem monotonous, if you don't know. Sometimes we's busy all day, though, and then's when it takes work to handle your temper. When there's a fire, it just seems as though every drop on the board falls if the people see the engines. Every one wants to know where the fire is, and it makes work for us."

"Number ———? Number? Yes, this is central! Still talking!

"I'd never flirt over the telephone. You ought to hear some of them." The central girl grew confidential as she lowered her voice.

"Say," she said, "I know a couple that flirted over the telephone for almost a year. Then they got acquainted at a dance, or somewhere, and pretty soon they were engaged. I found that out, too, you know, for I never saw either of them. Once they quarreled—they meant it, too; and he didn't ring up for an awful long time. I was worried, for I rather liked him—just over the telephone, you know. One day, just to see what would happen, I rang her number and she came to the telephone. Then I just plugged her right in on his line, and—well, I was scared for a while. I don't know whether he came to the telephone or not, but they've got a telephone of their own now—that's it, right there."

Another drop fell with a rattle.

"Number, please?" said the central girl.

Concerning Telephone Lines

SAMUEL G. McMEEN.

PROTECTIVE APPARATUS.

When the cables entering a central office are terminated by iron cable heads, by potheads, or by lengths of wool cables, the lines in them require to be carried through protective devices. This protection is necessary primarily for the safeguarding of the apparatus to which the lines are connected. In a degree, as now practiced, it prevents damage to the office cables which extend the lines from the protective apparatus to the mechanisms of the switchboard and its associated parts. The protective devices serve the further use of preventing fire damage to the premises.

So far as the apparatus immediately to be described is concerned, it is not its office to prevent damage to the underground or aerial cables themselves. Protection against such a damage is necessary under certain, if not all, conditions, and will be treated apart from the immediate discussion. Wherever the elements of a protective system for the central office ends, lines may be located, and whatever may be their mechanical relations to other parts of the equipment, these elements are always three in number, and must have a definite circuit relation to each other. The three elements are: a fuse, a heat coil, and a device consisting of two conducting surfaces separated by a small space. The last mentioned device is known by various names, being called a lightning arrester, an open-space cut out, a spark gap, etc. In most protective systems it consists of two carbon blocks separated by a slip of insulating material. This insulator is made of mica, silk, celluloid or other material, as the fancy of the designer has dictated.

The purposes of the three elements are these: The fuse is to provide a means by which the line will be opened in case there flows in it a current large enough to endanger the things the system is to protect. This does not mean that it is possible, necessary or good practice to try to insert in the line a fuse which will operate to open the line whenever it is carrying a current large enough to damage central office apparatus if it should flow through that apparatus. There are reasons why this could not be accomplished for all conditions which may be met. The thing a fuse must do is to carry all normal operating currents of the system, to withstand the momentary rushes of current resulting from lightning disturbances, and to blow when, by reason of the operation of some other unit of the protective system, the current in the fuse shall be large. It should also be so arranged that it will not endanger its surroundings, such as insulated wires, its own enclosing cable box, or adjacent things in the central office, by any frame which it may emit in operating. It will be seen that these requirements are severe, but they have been met successfully. One method of rendering the fuse sufficiently insensitive to the sudden rush of current due to lightning disturbances, is to make it in the form of a ribbon instead of round wire. The process is simply that of increasing the surface of the conductor without changing its cross section, and reaches the result effectively.

The office of the open-space cutout is a double one; first, it provides a path for carrying to ground lightning discharges; second, it operates under potentials of a few hundred volts, and establishes a path to ground in itself which did not exist before. In certain forms of open-space cutouts, the separation of the carbon blocks is held between the limits of .005" and .0055". With such a separation between the blocks, and with a certain roughness of their surfaces, an arc will be established from block to block whenever a difference of potential of about 400 volts is reached. In one design, this element of the protective system has the further feature that one of the blocks has imbedded in it a small globule of easily fusible metal. The intent is that upon the establishment of the arc, the blocks will be heated and the fusible metal melted, short circuiting the whole device. If this takes place, a direct path of low resistance to ground will be provided, very much lower than a path through the central office apparatus. The resulting large increase in current will immediately blow the fuse, because with a potential high enough to operate the cutout, and only the resistance of the line wire from the contact with the source to the low resistance ground in the central office, a very large current will flow for the short time the fuse requires to operate.

But there are conditions of contact with a dangerous source of current in which, due to the low potential of the source or to the imperfectness of the contact, only a small current flows into the central office, not large enough to operate the fuse nor cause a potential high enough to operate the open-space cutout. This current, although small, may be large enough to heat the windings of the central office apparatus to a point sufficient to damage them. As all matters of electric heating are functions of current and of time, a small current in a sufficient time will produce this damage. The obvious protection, therefore, is to insert as an element of the protective system, a device which is also operative as a function of current and of time, and in which the time element is a smaller one than that required for apparatus damage with that current. Such a safety device as this is provided in the heat coil; in most systems its relation to the other parts is such that when it operates it will ground the line. Once this is done, the fuse will do one of two things; it will operate because of the great increase of current caused by the low resistance path to ground, or will not operate because the current is too low to make it do so. If, therefore, the fuses are designed to blow on a current just under that required to damage cable wires, without reference to the amount required to damage apparatus, the conditions of most general safety will be provided.

In Figure 1 are shown the relations of one wire of the line to the three elements of protective apparatus. In any system which involves three elements of this kind the relation of the parts must be as this figure shows. That is, thinking from the subscriber's station toward the central office, the line must pass through the fuse, by the point at which the branch to the carbon blocks is taken, by the branch to the spring which grounds the line when the heat coil operates, through the heat coil, and then to the switchboard. It is from a disregard of this necessary arrangement of the parts with relation to each other that some installations of protective devices have destroyed themselves in their effort to operate, and sometimes have permitted damage by not arresting the currents they were set to stop.

The proper position of the fuse is a subject which has been a matter of controversy. If it is kept clearly in mind that the first duty of the protective system, as here treated, is to prevent foreign currents from damaging the central office equipment and surrounding things, the conclusion must be reached that the proper position of the fuse is in the line at a point just toward the central office from the last bit of line wire which can come in contact with a source of dangerous current. The term *exposed* may be applied to such

wire of the line as may ever come in contact with the source of dangerous current. The term *unexposed* may be applied to all wire of the line which is secure from such contact. Wiring of the following classes may be considered to be classified as unexposed:

Underground cables.

Cables formed of wires insulated with rubber.

Wiring wholly within buildings.

With reference to the last item, it is assumed that the wiring will be done in accordance with proper rules for such work. All other wiring than that classified as unexposed may be considered to be open to the hazard of accidental contact, and in this class will fall, aerial cables having lead sheaths; that such a classification is fair is borne out by the fact that the contact between such a cable and a wire of high potential with reference to the earth, very frequently causes an arc which destroys the sheath and allows current to enter the wires of the core. The results, therefore, are as serious as if the lines within the cable had been open wires.

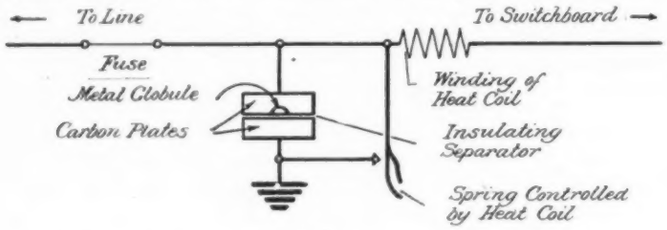


FIG. 1.

In view of the foregoing, the following simple rule will cover the position of the fuse:

The proper position of the fuse is at or near the point of junction between exposed and unexposed wiring.

Applying the rule to the case of a central office having lines entering wholly through underground cables, the fuse is located at the outer ends of these cables, as that is the point of junction between the unexposed underground wires and the exposed aerial distributing wires.

In the instance of a central office in which the lines enter by means of aerial cables, the proper position of the fuse is at the central office end of these cables, as that is the point of junction between the exposed wires of the cables and the unexposed wiring at the central office.

As the fuse may vary in its location, being or not being a part of the central office equipment, it will be considered in these articles as belonging wholly to the line construction phase of the subject, the heat coil and open-space cutout being treated as central office equipment elements.

There are three ways in which open-space cutouts and heat coils may be associated with other parts of the central office equipment: First, on the iron cable heads in which the cables terminate; second, on the side of the main distributing frame with which the incoming lines immediately connect, and, third, on the switchboard side of the main distributing frame. Unless there are special reasons why it should be done, iron cable heads with arresters on them are not used. Whether the arresters should be mounted as a function of the lines or as a function of the switchboard conductors on the main frame depends on the conclusion of the engineer of the problem with reference to the magnitude of the reasons for and against one plan or the other. The advantage of placing the arresters on the line side of the main frame is that as the tests of the line are ordinarily made from the arrester, such a location enables the tests to include no part of the central office wiring proper, but to be applied immediately to the outgoing cable conductors. The elimination of the jumper wires of the frame from the test is thought to be considered an advantage in certain circumstances. The advantage of placing the arresters on the switchboard side of the main frame is that the full number will then be no greater than the number of lines in the switchboard. As the number of lines entering the central office may be from twenty per cent to fifty per cent greater than the number in the switchboard, the arrester equipment is naturally much less in the latter case. The advantage of more refined testing facilities must be weighed, therefore, against the advantage of lower initial cost, and it should not be difficult to determine the price one must pay for the refinement. By far the greater number of modern equipments have the arresters a function of the switchboard.

In Figure 2 are shown the outlines of one arrangement of heat coils and open-space cutouts with their springs for use on an iron frame. Practically all protective systems utilize this typical arrangement, although the feature of an alarm circuit is not always applied.

I have said that the intent of the devices which have been described is to protect the equipment in the central office, and that in some degree it operates also to protect the aerial and underground cables. It does the latter by opening the line at the fuse when contact is made with a source of potential. It is not effective, however, in all cases of lightning discharges, and unless additional elements of protection are applied, long open wires may bring such charges into the cables as to cause discharges with resulting injury.

The great majority of distributing wires are of such short length as not to be capable of picking up atmospheric potentials to a dangerous degree. Long open wires, however, may do this. The surest protection is the placing of an additional open-space cutout at a point near the junction of the open wire and the cabling. So far as lightning alone is concerned, this method is effectual. Unfortunately for simplicity, however, a new hazard is introduced, in that a cutout with a separation between the blocks small enough to guard the cable conductors against a damage from a discharge has also a separation small enough for an arc to be caused by a potential from an accidental contact of about 1,000 volts. If such a contact is made and an arc is started

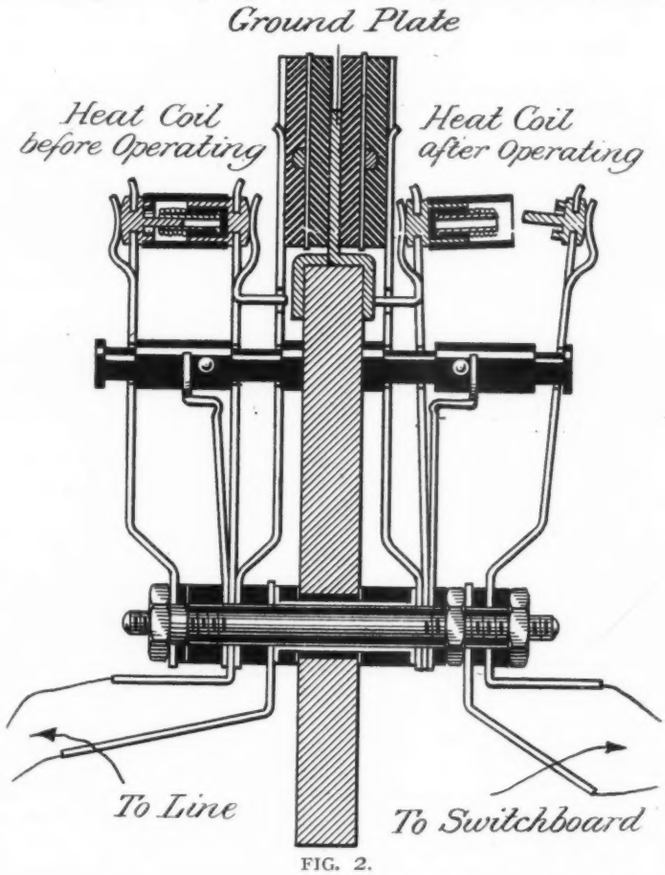


FIG. 2.

between the carbon blocks, it may be maintained until the blocks are destroyed by the arc, and fire may destroy the wiring and protecting box. To offset this hazard, therefore, a fuse should be inserted in the line, toward the open wire portion. It will be of no value if placed in the line toward the central office from the point where the open-space cutout is attached.

A separation of .01" is a practical one between the carbons of a cutout used at the end of a cable. This separation diminishes the likelihood of starting an arc at a time of contact, and throws the burden of grounding where it belongs, upon the cutout in the central office.

If it were not necessary to protect telephone equipment against damage from currents of high potential, the protective apparatus of earlier days would still be satisfactory and efficient. The greater complication of the present system is the result of the necessity of protecting one electrical system against damage from the others. The present protective system can retain its present form only so long as the higher potential distributions are kept in about their present form. There is a tendency toward higher and higher polyphase transmission, and it is probable that developments will be made which will cause a considerable revision of the protective system.

VICTORY FOR NORTH ELECTRIC COMPANY.

An important decision was recently handed down in the United States Circuit Court of Appeals by Judges Lurton, Severens and Richards, in which the North Electric Company of Cleveland, Ohio, gained a sweeping victory over the Western Electric Company of Chicago, the court sustaining the right of the North company to manufacture the Warner (tubular) drop. The opinion is a complete vindication of the lower court decision by Judge Wing.

The argument for the Western Electric Company was made by Attorney Rector, a prominent member of the Chicago bar, assisted by Messrs. Barton and Tanner, the regular Western Electric attorneys.

A full description of the patent suit and opinion of the lower court, Judge Wing presiding, appeared in the June number, 1903, of TELEPHONY, page 387.

The court's statement of the case and the opinion in full follows:

This is a bill to restrain infringement of claims one and four of Patent No. 477,616, for an "improvement in electric-annunciator drops, issued to James C. Warner, assignor to the Western Electric Company."

Upon the pleadings and evidence Wing, district judge, dismissed the bill, holding the first claim void for want of novelty, and the fourth, if valid, not infringed.

Lurton, circuit judge, delivered opinion of the court.

The patentee recites in his specifications that his invention "relates to electric annunciators of the class usually employed as individual signaling devices in the telephone exchange system," and that his objects, so far as they relate to the two claims involved, are, "to provide a soft iron shield about the coil, so as to prevent as far as possible inductive effects between the coils of the different magnets when placed near each other;" and "to provide for carrying out the ends of the wire of the coil of each annunciator to separate connecting pieces at the rear, so that they may be readily accessible."

The claims in suit read as follows:

"1. The combination, with the coil or helix, of a soft iron shield surrounding the same, the armature at the rear of the core of said helix, and the armature-lever extending forward through a slot or opening in the plate *b* and the drop with which said lever is adapted to be engaged when the drop is lifted and to be disengaged therefrom when the armature is attracted, substantially as and for the purpose specified."

"4. The annunciator provided with the armature *d* provided with openings, the ends of the wire of the helix being carried back through said openings in said armature and connected with insulated connecting pieces *h i* respectively, substantially as and for the purpose specified."

Electric annunciators were well known in the electric art when Warner applied for the patent.

One of the constructions most in use was the subject of a patent issued to the same inventor, October 24, 1882, serial number 266,405. The magnetic annunciator there shown and claimed is the device of the first claim, except the soft iron tube enclosing the coil or helix.

We need not indulge in the scientific aspects of magnetic or electric inductors. It is enough to say that one of the manifestations of magnetic induction, between adjacent annunciators, is to produce between the users of two talking circuits connected with two adjacent electric annunciators a transfer of the voice current from one circuit to the other, called in the vocabulary of the telephone art "cross-talk." This "cross-talk" is undeniably the result of a considerable degree of induction and in proportion as induction is prevented cross-talk currents are less observable or annoying. While, therefore, the patentee does not refer to "cross-talk" in his specifications, as something which it was his object to suppress or minimize, he does distinctly declare his object to be, "to prevent as far as possible inductive effects between the coils of the different magnets when placed near each other."

Undoubtedly one of the effects of induction is to weaken the force of the current by the waste thus caused. But another defect in telephony was this disagreeable "cross-talk" between users of different talking circuits. Warner proposed to minimize induction as far as possible and his method for doing it was to surround the magnetic coil with a tube of soft iron.

That induction was by this device so minimized as to cause the practical disappearance of "cross-talk" is established. As one incidental result it became feasible to arrange such annunciators very closely together in ranks with one row in line above another in telephone exchanges.

This enabled considerable economy of space in the organization of telephone exchanges where there were a large number of subscribers, and possibly some economy of operator service. But it was not new to surround the magnetic coil of an annunciator with a shield or tubing of soft iron. The English patent of 1875 to Faulkner shows an annunciator magnet inside soft iron tubing.

Faulkner's improvements are described as relating to "inductors" as well as electric bells, telegraph sounders, etc., and consists, says the patentee, "in using a round, square or other shaped iron tube or case to cover the outside of the coil or bobbin." The object he says is "to collect, accumulate and utilize all the magnetic or electric power, thereby preventing the loss of force that takes place in the electro-magnets or magneto-electro magnets as hitherto used."

True he does not say that loss of force by induction was to be thereby prevented, but that is necessarily accomplished by his device and is but one of the modes of loss of electric force.

Figure 6 of his drawings shows an electric indicator not materially different from that of Warner, though not in form adapted to use in telephone exchanges with economy of space.

That Faulkner suggested an alternative form by which his tubing might be made in several pieces or by the employment of an iron segment only, is not destructive of the teaching of his patent.

His preferred form is that the tubing shall be in one piece. In that form the best results against waste of magnetic cross currents are obtained, and that form is the one used in each of Faulkner's several drawings.

That magnetic force will not act across a shield of soft iron seems to have been a well known fact in the field of electric art and in an elementary work* upon this subject, open and known to the public, we find this stated, and that "if a small magnet is suspended inside a hollow ball made of iron, no outside magnet will affect it. A hollow shell of iron will, therefore, act as a magnetic cage and secure the space inside from magnetic influence."

Claim one must be held void for want of novelty.

One of the other objects of the inventor, we have already seen, was to provide "for carrying out the ends of the wires of the coil of each annunciator to separate connecting pieces at the rear, so that they may be readily accessible." He further states in his patent, that with this object his invention consists "in providing an opening or openings in the armature and an insulated support at the rear of the same, upon which are mounted connecting pieces, the different ends of the coil being carried back to said connecting piece to make the connection readily accessible at the rear."

Upon this is based the fourth claim.

We agree with the court below in saying that "no change in the operation of the device was effected by thus leading the wires out of the helix through the armature. Nothing was accomplished, except possibly greater convenience in attachment." To carry the magnet wire back to the rear of the case for the purpose of attachment was not old. Neither was it new to convey them back through openings in the armature. For such an arrangement see patents to Burnett No. 360,266, Shelbourne No. 342,881, Sawyer No. 242,055, and British patent to Eldred No. 1883.

If the claim is to be sustained at all, which is a doubtful matter, it can only be sustained by confining Warner to the specific device he has described.

Thus limited the defendant does not infringe.

The decree dismissing the bill is therefore affirmed.

(*Elementary Laws in Electricity and Magnetism, by S. P. Thompson. Edition, 1887.)

DIGEST OF TELEPHONE PATENTS

Conducted by Edward E. Clement

755,630—Bell. W. W. Dean.

This is the Kellogg ringer, having the armature yoke *19* secured to the poles *14* by adjustable screws *16* tapped therein. Check nuts *18* hold the yoke on the screws, and the latter serve as adjustable extensions of the poles to regulate the air gap between them and the armature.

757,031—Semi-automatic telephone exchange. E. A. Faller.

757,030—Signaling apparatus. E. A. Faller.

A few years ago, when the Independent movement was young, there was a tendency to depart from the lines already accepted as standard with regard to large switchboards. The multiple-board was looked upon by the Bell engineers as the only means of successfully handling the business in any exchange having over a few hundred subscribers. The departure from this was in the direction of transfer or divided central board, and really involved a return to first principles in the art. This departure was not successful, or, perhaps, it is more accurate to say, that it was smothered. Even divided multiple-boards did not meet with permanent favor, as one large manufacturer found to his cost. This may have been due in part to faulty design or construction, but whatever the cause the fact remains that straight multiple-boards became as strongly advocated by the best Independent engineers as they ever were by the Bell. It is unnecessary for me to dwell here upon the admitted disadvantages of multiple, nor to compare them with the well-known disadvantages of ordinary transfer systems. I believe that as in all cases where inexorable commercial laws work selectively, the multiple-board has been in general use because practically it has been the best thing available. It is always unwise, however, to become so wedded to things-as-they-are as to totally disregard things-as-they-may-be, for from these invariably spring in due course of time the things-that-will-be. *Tempora mutantur, et nos mutamur in illis.* Who stands still, progresses backward in the march of events, as the Chinese put it. We have seen large exchanges built and operating with automatic central office apparatus, and as I have pointed out before, the apostles of the manual telephone can already derive valuable lessons from the workers in automatic. Good springs from all things for the receptive mind, but the scoffer learns nothing.

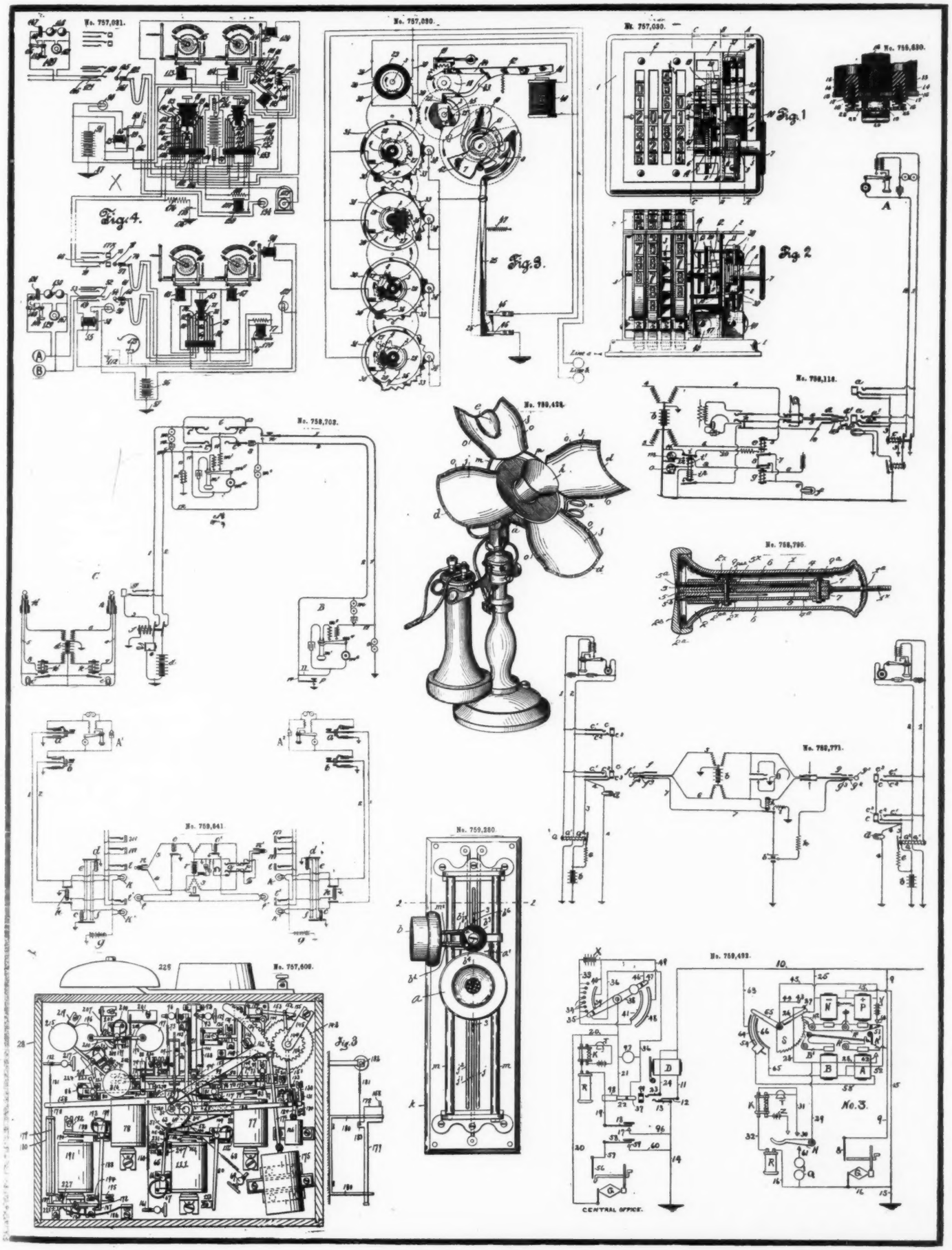
All of which is merely introductory to a necessarily brief review of two patents that are of especial interest at this time. The Faller automatic operator has become pretty well known, as have the names of Mr. Faller and Mr. Chisholm. The system and apparatus here presented involve the application of automatic principles of selection to a manual board, the actual connections being made by human operators, working with ordinary plugs and cords and trunk lines. The necessity for oral communication between the subscribers and the operators is done away with, the wanted trunk and the wanted subscriber being indicated to each operator by appropriate signals set in due sequence by the automatic transmitter at the subscriber's station. Very ingenious provision is made for time saving by transmitting two digits of the required number at once, and for certainty of operation by dividing the signal into two parts, the first part selecting the trunk (which means the desired section or position), and the second part selecting the number of the wanted subscriber on that section or in that position. The subscriber's signal when set remains latent until the operator answers, and this applies both to the subscriber's operator and the trunk operator. Apart from sticking the plugs where the signals indicate, the operator's only acts are the routine depression of cord keys in 1, 2, 3 order.

Patent 757,030 covers the subscriber's selector or signal transmitter, and the other covers the central office apparatus. The former is illustrated in Figures *1*, *2* and *3* herewith, and the latter diagramatically in Figure *4*.

Referring to Figures *1*, *2* and *3*, the subscriber's apparatus is all enclosed in a box, or casing, mounted on a base *1*. It comprises a spring driven clockwork, with four number wheels *33* and one detent magnet, *40*. The edges of the number wheels are exposed on the box, and the casing has two arrows between which the desired digits are brought into line, for calling, by turning the wheels, which remain where they are set. In Figure *1* the number wanted is 2071.

Figure *3* shows the circuits. Full centralized energy is employed for all purposes. The toothed wheels *4* are shown spread out, the thousands wheel at the bottom, with the hundreds, tens, and units wheels in sequence above. Each when released makes and breaks the circuit in which it is connected by means of the teeth *27*, and each is connected to one of the line-wires and ground during a portion of its revolution only, the ground being put on by the segment *28* as the wheel revolves it under the spring *36* secured to the outside toothed setting-wheel *33*. The wheels *4* are all in the same shaft *3*, driven through intermediate gears by the mainspring, which is wound up by the knob *7* after the wheels have been set. The knob itself cannot be manipulated the second time until the signal is all sent in, being held by a detent on lever *25*, taking over the arm *8* on the arbor *6*. The detent magnet *40*, through its armature *41*, controls the forked lever *41*, the upper end of which serves as a stop normally for the pin *20* on the scape wheel. The lower arm *43* divides the signal by catching first on one tooth and then on the other shown at *22* on the disc *21*.

Supposing the wheels *31* to be set as shown, a circuit is thereby closed to the central office and over the ground (put on at *26-46*), which displays the line-signal as usual. The operator sticks the answering plug, and energizes the magnet *40* over the metallic circuit. The shaft *3* commences to revolve, and the thousands and hundreds wheels send in their signals, one over line *a* and the other over line *b*, with ground return. These set the two digits of the trunk number, and the operator sticks the other plug of her pair into the trunk jack indicated. The trunk operator gets a signal, and as in the meantime the subscriber's clockwork has stopped, owing to the detent arm *43* holding the disc *21*, she again energizes magnet *40* to release the clockwork and set her indicators at the number wanted, on her section. At this time the hundreds and units wheels only have come into connection with the two sides of line respectively, through the springs *30* and *36*. When the full signal has been transmitted the ground is taken off by the cam *10* com-


No. 757,021.
Fig. 4.
No. 757,030.
Fig. 3.
No. 757,030.
Fig. 1
Fig. 2
No. 758,030.
No. 758,116.
No. 758,702.
No. 758,428.
No. 758,795.
No. 758,771.
No. 759,641.
No. 759,280.
No. 757,609.
Fig. 3
No. 759,493.
No. 3.
CENTRAL OFFICE.

ing into dotted line position (Figure 3) and forcing back lever 25.

With regard to the central office circuits, I will not attempt any lengthy explanation, but will merely outline the operation. The keys are not as complicated as they look, although they will probably be simplified in practice, and all the apparatus is so well described that I recommend those interested to get the specification and read it.

In Figure 4, 129 and 149 represent two subscribers' stations on metallic circuit, each provided with ordinary and common talking and ringing set and with an ordinary transmitter as set forth above. Suppose a call comes in from station 129 for the other station, which is on a different section. One of the answering plugs, as 61, is inserted in the answering jack 54, and the key 63 put in its first position. This connects the magnets 65 and 67 from the two sides of the cord to the battery 56 and ground. These magnets then respond to the thousands and hundreds wheels respectively to set their indicators to the digits of the trunk number, both working simultaneously. The operator then plugs through with plug 97 in trunk jack 73 and lights lamp 90 before the trunk operator. The latter then works her key 81 to connect the two magnets 113 and 114 to the two sides of line, the other pair of magnets having been already removed by the further manipulation of key 63. At the same time the trunk operator sends current over the metallic circuit to release the second part of the signal at subscriber's station, and the tens and units digits come in simultaneously on indicators 115 and 116, the connection being then completed by plug 151 in jack 121. The subscriber is rung up by generator 127 on key 139, and supervisory relays 76 and 157 are connected by the keys, each keeping its lamp lighted until the end of the conversation. 94 and 124 are restoring magnets in local circuits closed to release the indicators, and if multiple trunks are employed a test telephone 173 in the cord and a test battery 175 on the trunk are provided.

757,609—Electrical telephone apparatus. Pliny H. Fisk.

This is a selective party line scheme, which requires seven sheets of drawing, containing nineteen figures with nine printed pages of description for its elucidation. The figure I have selected and present herewith is a sectional view of the selecting mechanism and its enclosing casing. There is one of these mechanisms for each telephone.

When any operator on the line desires to call up another station, he turns the crank of his generator after the usual manner, with the usual result of energizing the ringer magnet of each of the telephones on the line. These ringer magnets are employed as relays in the present case, having weighted contact arms opposite their armatures which are thrown out when the latter are vibrated, closing a local circuit in each case, including a battery and the magnet 77 on the right of the figure. This draws down its armature 83 and the lever 79, permitting spring 211 to close on post 213 to lock down the armature of magnet 77. In the middle of the apparatus is the selecting wheel 51, with the two contact springs 61 and 62 controlling the local circuits of the telephone. After the first ring up a succession of short impulses is sent by giving single turns to the generator handle and through the action of the magnets 77 and 78 the wheel is stepped around until only those contacts at the desired station are under the spring. The local circuit bell 228 is then rung for calling.

Individual lock-out mechanism is provided, and much subsidiary apparatus will be found described at great length by anyone whose curiosity is strong enough to keep up his strength during the reading of the patent.

757,709—Telephone transmitter. W. L. Wilhelm.

This invention purports to relate to a mounting or casing for a double diaphragm microphone of the type formerly patented by Mr. Wilhelm. The transmitter proper is shown at K in the drawing, and is supported upon the branched tubular holder F-F'. This has a screw-threaded neck f, which is passed through an opening in the front half of the containing shell B and has the mouthpiece G screwed on it from the outside, so that the holder and mouthpiece clamp the shell between them. This is the same sort of a scheme for a transmitter that is embodied in the North and the Barns receivers.

757,826—Telephony. A. Meinema.

This is another step-by-step selective party line lockout system. Mr. Meinema is evidently a practical telephone man, and anyone who wishes to know why I say this has only to compare the drawing in this case with that in the Fisk case just briefed. A rotatable switch controlling wheel is provided here, g3, which has on it a lug, g4, which is stepped around by using the key c3 at the central until it is opposite the springs i, k and l, i and k being in the circuit of the usual ringer r, and l completing the talking circuit. The wheel g3 is mounted on a base m, which slides upon a transverse rod, being moved over to the left when the hook p rises. If the block g4 is then opposite the springs i and k, these have already been put into contact with each other thereby, so that the operator can ring the bell by using grounded generator c; and when the subscriber answers and the hook goes up the block g4 forces the springs into contact with l to close the talking circuit. At the same time the ringing circuit is opened at the hook contacts and the local transmitter circuit is closed by the hook. At all others beside the station called the block g4 is away from the springs i and k, and the local circuits are therefore open.

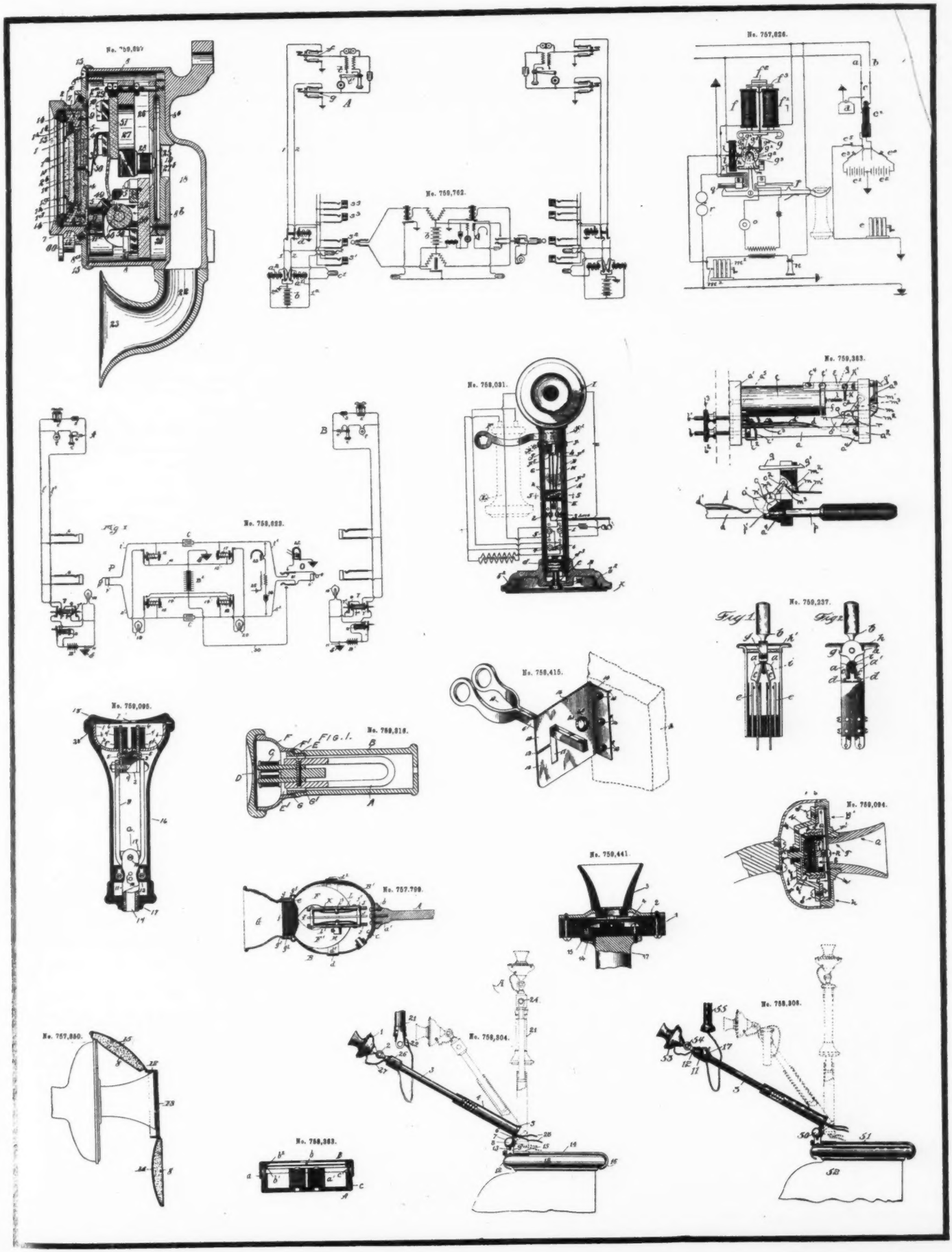
The stepping is done by the polarized magnet f-f', whose armature f3 controls the sliding pawl arm g5. The wheel g3 is stepped around against the pressure of a spring shown on the spindle, and is prevented from returning after each step by the stop pawl g7. At the end of a communication the operator reverses the current on the line by means of key c4, whereupon the armature f3 throws the slide g5 over to the left and pushes back the stop pawl to release the wheel.

757,850—Antiseptic attachment for telephones. H. L. Thompson.

This consists of a shield of fine mesh wire adapted to be placed over the opening in the mouthpiece of a transmitter, together with an antiseptic case or box therefor. In the figure herewith 12 is a metal ring having the disc of fine mesh wire 13 fastened within it, and having also two covers 14 and 15 hinged like the front and back of a watch case. Each lid or cover is provided with an absorbent pad 8 loaded with germicide. The device is supposed to be closed up like a watch and carried in the pocket. When about to use a telephone it is taken out, opened and placed over the mouthpiece, whereupon all ravening bacteria which may be lying in wait upon the interior surfaces of the mouthpiece are compelled to remain there or meet a dreadful fate. Most devices of this character are intended to shut out the germs, upon the communistic theory that protection for all should be afforded. This is the first device I have seen that shuts in the germs and protects only the individual user.

758,031—Telephone desk set. H. P. Clausen.

This is a very well known type of desk set that has been put out by the American Electric Telephone Company for some time. It was furnished for use in Philadelphia among other places, in considerable numbers, and has been much commended for good general design. The underlying principle involved here is that of having a skeleton upon which all the operative parts are mounted and covering it with a shell. The basic feature of mechanical design is the provision of a base and head, the latter carrying the transmit


No. 759,097
No. 759,762.
No. 757,826.
No. 759,031.
No. 759,363.
No. 759,023.
No. 759,237.
No. 759,415.
No. 759,095.
No. 759,316.
No. 759,094.
No. 759,441.
No. 757,799.
No. 757,850.
No. 759,304.
No. 759,306.
No. 759,363.

ter, with a tubular shell between them and the inner mounting or skeleton with a single screw fastening all the parts together.

In the drawing herewith, *B* is a base of usual type; *I* is the transmitter carried on a head with the usual knuckle joint; *A* is the tubular shell or grip of the instrument, having one end set in the base and the other resting against a shoulder on the head; and *D* is the mounting or skeleton strip referred to. This is secured to the head at its upper end by a suitable screw and extends through the tube *A* to the base, which is secured to it by a single screw *E* inserted from beneath and tapped into the turned-over end of the strip *D*. Upon this strip the switchhook with its springs and the circuit terminals for the instrument are mounted, as shown, a double function being thus subserved—that of a terminal rack and also that of a tie rod between the head and base. The patent is the property of the American Electric Telephone Company.

758,116—Supervisory signal apparatus for telephone switchboards. E. H. Smythe.

When in a central energy telephone system a subscriber answers a call from the central office, and after the conclusion of the conversation hangs up again, his supervisory signal in the operator's cord circuit is first extinguished (as he answers) and afterward relighted (for disconnect signal). Now, if the subscriber desires to make another call immediately, and again takes down his receiver before the operator has cleared out, the result will be to again put out his supervisory lamp, whence the operator, if she has not already taken note of the disconnect signal, gets no signal at all. The subscriber, getting no answer, if in haste, proceeds to swear at the company and the service; if he is wise he proceeds to jiggle his hook. This makes the supervisory lamp flash, and serves as a recall signal to the operator.

Just how often this state of affairs occurs in practice I cannot say, but Mr. Smythe's invention is directed to means for preventing the subscriber from being hung up, so he evidently considers it a serious, if not a frequent occurrence. His means consist simply of a couple of relays cutting in commutators to flash the supervisory lamps as soon as the supervisory relays have once worked. When a subscriber answers the lamp goes out. When he hangs up the lamp flashes rapidly. If he again calls before the cords are taken down the lamp flashes slowly. If the operator is not hypnotically dazed by the fireworks she answers.

The mechanism involved includes the commutators *m* and *o*, the self-locking relay *i*, and a relay *g*, in addition to the regular supervisory relay *e*. Relays are cheap (on paper), so why not? The main circuits are those of the standard relay type common battery boards of the Bell company. The bridged main battery *b* grounded on one side as usual supplies current to line through the supervisory relay *e* when the subscriber takes down his telephone, this relay then closing shunt *6-7-10* around the supervisory lamp *f*, and opening shunt *7-8* around the relay *g*, which pulls down its armature and cuts in the flashing commutator *o*, which runs rapidly, but does not yet affect the lamp *f* because its connection is broken at *8*. When the subscriber hangs up at the end of the conversation, the armature of the supervisory relay *e* closes at *8*, and the lamp *f* flashes rapidly. This current passes through the winding *i'* on relay *i*, which pulls down its armature and closes on *12* the circuit of commutator *m*, so that if the subscriber calls again before the cord is down, the supervisory relay *e* pulling up cuts in the slow flasher. All may be expressed in a word by saying that after the supervisory relay has once pulled up and let go its armature the latter cuts in a flasher on each side, according to its position, one fast and the other slow. This patent belongs to the Western Electric Company.

758,304—Office desk telephone. A. R. Fergusson.

Mr. Fergusson's residence is in New York, N. Y., and this patent is assigned to the Electro-Mechanical Specialty Company of the same place. The invention consists in the combination of a telephone set with a telescoping arm mounted on a base adapted to be clamped to the top or back of the desk. The tube *4* has a ball and socket joint connection with the base *15*, which comprises curved fingers *12-15* and a tie rod *14* to clamp them on the desk. The tube *3* telescopes into the tube *4*, and itself contains the transmitter and receiver conductors. It also contains a switch at *26*, the lever of which is not hooked as usual, but has a button head to co-operate with the eye *22* on the receiver. The latter is hung on the lever, and the arms thrown up out of the way when not in use, as indicated in dotted lines.

758,306—Electric switch. A. R. Fergusson.

This is the same man, and the patent is assigned to the same parties as above. The present invention is a corollary to the former, in that it provides a switch with the usual hooked lever for the receiver to hang upon. As the transmitter arm is adapted to swing through an arc of ninety degrees or more, the receiver would be thrown out of a rigid hook, and so this hook is swiveled on the operating spindle, working the latter in and out by a cam face which revolves with the hook over the end of the spindle. The full line position in the figure herewith shows the receiver off, but about to be placed on the hook, and the dotted line positions show the movement into a vertical line, the receiver always hanging the same.

758,363—Telephone receiver. M. R. Hutchison.

This is Miller Reese Hutchison of the Hutchison Acoustic Company of New York city, to whom the present patent, like many others of the same inventor, is assigned. Most of the apparatus put out by this company is for the use of the deaf, and in the treatment of ear troubles as well as in the transmission of ordinary sounds it has seemed desirable to have a receiver with an adjustable diaphragm. For this reason Mr. Hutchison has taken the adjustable cap carrying the diaphragm, which was originally designed by Stromberg & Carlson, and has put a graduated scale on the case, so the degree of adjustment may be read off. This calls to mind the early magneto work of Messrs. Stromberg and Carlson, whose magneto transmitter built on this pattern was probably the finest instrument of its class ever produced by any one. In order to prevent displacement of the cap when adjusted a series of spring pressed latch pins *c* is set in the edge of the shell to register with sockets in the cap ring *b'*. All these pins enter sockets when one does, and accidental displacement is thus prevented.

758,415—Telephone Instrument. A. C. Christopher.

This patent is assigned to the Kellogg Switchboard and Supply Company, of Chicago, and covers the form of escutcheon for central energy instruments which they have recently put out. The escutcheon has been an annoyingly imperfect detail for a long time in most makes of instruments, and various efforts have been made to improve it. Making it in two parts and having the desk of the instrument swing down on a line through the escutcheon has been probably as good a solution as has been heretofore reached by anybody. According to Mr. Christopher's plan the whole thing is punched out of a single piece, the slot *17* being made in the blank, and a side cut *9* being made from the main slot to the edge of the blank. When the escutcheon is in place the hook is introduced by turning it sidewise and spreading the edges of the cut *19* oppositely, so that it can slip between them as they spring apart. They then spring together again and assume the appearance shown in the figure herewith. The receiver cord is taken out through a hole back of the slot, as shown.

758,623—Telephone System. W. W. Dean.

This is a system having a line relay of comparatively high resistance and a cut-off relay normally in series therewith but not capable of being energized by the amount of current that will be passed by the higher line relay. When a plug is inserted in answer to a call a low resistance path is closed which permits more current to flow through the cut-off relay, whereupon the latter is energized and disconnects the line relay. In such an arrangement without some special provision to prevent, a low wound relay is connected between one side of the talking circuit and ground or the office return, or the marginal difference of resistance between the line relay and the cut-off is so small as to cause trouble. To prevent this Mr. Dean in the present case normally short-circuits part of the cut-off relay windings, and in the operation of the relay breaks the short-circuit so as to leave a high winding in the return.

In the figure *7* is the cut-off relay and *8* the line signal relay. In the normal condition of the apparatus the winding 7^2 is shunted by the armature 7^3 and wire *9*, the line circuit to battery being then through the relay *8* and battery *B'*. When a plug is inserted in the jack relay *7* is energized by means of the short low resistance winding *7'* to pull up the armature, cutting off the relay *8* and cutting in the whole winding *7'*-7^2 of the relay *7*. This leaves sufficient resistance and impedance in the branch containing relay *7* to avoid the trouble adverted to.

The patent is assigned to the Kellogg Switchboard and Supply Company, the invention having been made before Mr. Dean left their employ, and the application filed in May, 1901.

758,703—Apparatus for telephone lines. C. E. Scribner and J. L. McQuarrie.

This is a common battery two-party line system, using the standard Bell relay type switchboard circuits at the central office, a double throw switch at one subscriber's station, and bridged talking sets at both stations. Either subscriber can call central or be called from central in the ordinary way, and either subscriber can call the other without calling central, all with centralized current supply.

In the diagram herewith the line wires *1-2* go out from the central office *C* to the substations *A* and *B*, passing through the switch *1* at the former. At each substation a key is provided for calling the other, this being lettered *n* at station *A* and *p* at station *B*. To call from central a generator is connected by the usual key, not shown, the polarized bell at each substation being in a bridge with a condenser, as shown at *m* in both cases. To call in from the substations to central the receiver is taken down, bringing either talking set into a bridge, that at station *A* being marked *11*. To call station *B* from station *A*, the key *n* is depressed, closing a circuit from the battery *d* at central (this being grounded on one side between itself and the line signal *e*) through line wire *2* and by this path: *2-12-m6-n-1-*(extension)-single stroke bell *o* at station *B*, and to ground and back to battery. This strikes the bell at station *B*. Both subscribers then take down their receivers, and both transmitters are fed from the central battery as follows: That at station *A* from *d* through *2-11-m2-m4-m3-13-*1^2-impedance coil *m7* and ground. That at station *B* from *d* through line wire *2*, and by *12-m6*-extension line *2-11-m2-m.p-m3-11* and bell *o* to ground. Part of the current over this circuit goes back by way of station *A* and ground through *13* and 1^2 there. The switch *1* is supposed to be thrown over to spread the springs *1'* and 1^2 for this connection between the substations. When calling central the station *A* has the switch pushed over to spread the other pair of springs 1^3 and 1^4, thereby cutting off the station *B*.

The auxiliary bells *m6* and *o* are single stroke in their action, and their windings serve to furnish impedance in their respective branches.

758,795—Telephone receiver. E. H. Strauss.

This is a tri-polar receiver of the North-Burns type. The cord passes into the shell and is connected to the winding by concealed terminals. The magnet structure has two outside bars *4* and *4a*, and a middle bar *8*, with a yoke piece *7* bolted in the heel end and three pole pieces at the diaphragm end. The middle pole piece is the only one that carries a winding, this being marked *5*. This pole is slotted at *5x* so as to be adjustable on the bolt *9*. The whole structure is carried on the bottom of the stamped metal cup *2*, the bolt *9* passing through extensions or ears formed on or attached to the cup at *2x*. These are also slotted to permit the general adjustment of the magnet structure. The bolt when tightened up locks the parts all in adjustment.

759,094—Telephone transmitter. J. I. Gemmill.

This is a granular transmitter of solid back type whose only peculiarity is apparently in the use of soft sponge rubber for the material of the rings separating and overlying the electrode plates. The diaphragm is secured to the front plate by a locking ring *D*, and the resistance button is carried between a bridge and the diaphragm in the usual manner. The rear electrode is seated in the bottom of a cup whose stem passes through the bridge, being bushed with insulation. The cup has an inner lining or cylinder of soft sponge rubber *M*, serving as a distance piece for the electrodes, between which it lies. The front electrode rests upon this around its edges and has an overlying sponge rubber ring *M'* upon which is clamped the retaining ring *H*. The patentee of this construction makes his transmitter water tight and produces certain improved results; but he does not say what will happen when the sponge rubber dries out and becomes hard, as it surely will in time. Neither does he explain what happens if the instrument gets heated up some.

Mr. Gemmill's address is Cleveland, Ohio.

759,095—Telephone receiver. J. I. Gemmill.

Mr. Gemmill is evidently getting out a line of new telephone designs. This receiver has a cup like the North-Burns instrument, with the magnet structure secured together by the usual transverse bolt through a block carrying the pole pieces *6-6*. The peculiar feature which distinguishes the instrument is the provision of a clevis at the heel end of the magnets, having a threaded neck *14*, hollow to pass the cord through and engaging the end of the shell to hold in the magnet and its cup *1*. The inner end of the clevis is forked to straddle the magnet, to which it is secured by a transverse block and bolt; and in the fork is fitted a block *12* of insulation, on which the terminals are placed for the coils *4-4*.

Here we have the tea table and the plow contributing to our uses. Verily the telephone engineer has laid all arts under contribution for his purposes.

759,237—Circuit changer. C. C. Cadden.

This is Mr. Cadden of the Williams-Abbott Company, to whom the present patent is assigned. His address given in the patent record is Cleveland, Ohio. His invention is applicable to operators' keys and to switchhooks. I have selected the figures showing the former for illustration herein. Fig. 1 is a side view of a key and Fig. 2 a view at a right angle thereto. The peculiar feature of the invention is the double bend in the contact springs whereby the ball of insulation which serves to spread them apart may move in a line across their length. For this purpose the ends of the springs are bent both ways at an angle, a side cut or slot permitting the outward bend or flare. In the figure *C-C* are the spring ends, bent toward each other, as shown in Fig. 1, and also slotted at *d-d* so as to be bent out as shown in Fig. 2 to form opposite cam faces. The key lever carries the ball *i* between the spring faces, which, as it moves to

right or left in Fig. 1, spreads one or the other pair of springs.

When applied to a switchhook the ball or its equivalent is carried on the lever arm.

759,280—Telephone attachment. S. C. Houghton and F. M. Potter.

This is a mounting and support for transmitter and receiver in the nature of an improvement on the device patented to S. C. Houghton July 20, 1897, No. 586,793. On a suitable backboard a series of vertical rods are fastened, and the combined transmitter and receiver support is mounted to slide up and down. Contact springs maintain the circuits in all positions. The support proper is a box containing a holding contact with electro-magnet so arranged that if a party leaves the instrument temporarily the circuit may be left closed, but if he remains away too long the central office operator may open it; also containing switch springs with an overlying cam spring to work them. The transmitter is attached to the front of the box and the receiver is mounted on two wires bent out from the side of the transmitter and terminating in a block of insulation shown at *b3*. This block is carried on a pivoted plate bearing on the cam spring referred to so that when the receiver is in use and is pressed out by the ear of the user the springs are closed to cut in the instruments. Circuit to the receiver is through the supporting wires, hence the insulating block.

It is a curious fact that of these two joint patentees Mr. Houghton is a resident of San Francisco, California, Mr. Potter a resident of Syracuse, New York, and their attorneys, Messrs. Noyes & Harriman, are domiciled in Boston, Massachusetts. Distance has certainly been annihilated in more than one way by this telephone.

759,316—Telephone receiver. W. C. Runge.

This is an improvement on a telephone receiver designed by Albert K. Keller for Payne & Co. of Philadelphia some years ago. Mr. Runge, the present inventor, is a citizen of the United States, but resides in London, England. The invention resides in a locking ring for maintaining the adjustment of the magnets. The latter are carried on the block *E*, recessed on its opposite faces to receive the poles. This block is screwed into the cup *F*, and the locking ring *G* is screwed in under it. The shell *B* is screwed on the end of the locking ring.

759,383—Combined switch socket and restoring annunciator. A. M. Knudsen.

This is Mr. Knudsen, formerly of Chicago, and the patent is assigned to Mr. Sands of Cleveland, Ohio. The application was filed in October, 1900. The invention is a mechanical self-restoring drop with jack, and is of the inner cam type. After an examination of Figure 4 herewith, any lengthy description is unnecessary. The drop is carried on a front plate through which the jack opening is made. A pivoted lever on the inner face of the plate has its lower end engaged by the plug and its upper end engaging the tail piece *m2* of the drop, so that as the plug is inserted the lever will be thrown up and the drop thrown into engagement with its hook *g'*. The cam lever is insulated where it touches the drop, in order that it may not short circuit the night-bell circuit. Claim 5 of the patent reads as follows:

"5. In a telephone annunciator, the combination of a spring-jack, a plug therefor, an operating magnet, a shutter and an arm insulated from said shutter and operated by said plug for restoring said shutter, substantially as described."

759,428—Telephone transmitter hood. R. D. Fannon.

This is an arrangement of enclosing wings for a transmitter to permit messages to be transmitted without those in the vicinity overhearing them. Four wings *d-d-d-d* are pivoted on a split ring clamped to the transmitter shell, and are encircled by a spring ring *m-m*, which holds them either back or forward as they are placed. When back they are as shown in the figure; when forward they enclose the transmitter so that the lips can be placed close thereto without other exposure. A hollow in the upper wing accommodates the nose and permits breathing freely—perhaps snorting, if not too violent.

This looks like broadening the field for the hygienic people who have been after the germs. These sheltering wings when folded with tender solicitude over the whispered words of—shall I say love?—would furnish room for many germs of one kind and another. On the whole I think I will not say love, but rather the report of a salesman on the order he did not land, or of a Bell "expert" on the Independent exchange he has been "inspecting." Lots of other things need privacy, and if germs like gossip this is a positive boon to them.

Mr. Fannon is a Chicagoan (Illinois), but his patent is assigned to Delos Dunton of Carpentersville, same illustrious state.

759,441—Telephone Transmitter. A. W. Hill.

Mr. Hill is a resident of the classic town of West Hoboken, New Jersey. He takes a solid block of carbon and lands an insulating ring *16* in it. A diaphragm *4* is laid on suitable insulating material around its edges, and a central electrode carried on it extends into the hole in the block lined by the ring aforesaid. This electrode carries a felt washer to keep the granular carbon in the hole, and a proper air chamber is formed in the block beneath the diaphragm. A metal cap takes securing screws put through from the back of the block—and this is called a "solid back."

The patent is assigned to Hill, D. P. Chesebro and Alfred E. Davidson, doing business as the Phonic Carbon Company of New York City.

759,492—Telephone exchange. E. A. Anderson.

Mr. Anderson hails from Salina, Kansas. He has produced a step-by-step selective party line telephone system. It works as follows: In the diagram herewith the central office is shown at the left and one station at the right. If the subscriber who is numbered *3*, should desire connection with another on the same line he first calls up by means of his generator *G* and throws down the drop *D* in the central office in the usual manner. The operator in response moves arm *38* onto the first contact *34*, which sends one impulse over line wire *10* and energizes magnet *N* to move the wheel *S* around one tooth to put arm *26* on contact *27*. This cuts in the subscriber's telephone set, and he expresses his wishes. The operator then manipulates the arm *28* to step around the arms of all stations to the desired number, only the one wanted and the one calling being left connected, however, as their circuits are on different contacts. After the subscribers are through talking the clearing-out signal is given by means of the generators in the usual way, throwing down the drop *07*. The operator then restores all the mechanisms to zero by reversing the current on the line, energizing *P* and *B* at each substation and throwing off the pawls *N2* and that on *B'*. The arm *38* serves as a pole changer by swinging backward and forward between the rings *41* and *48* on one end and the contacts *34* and ring *30* at the other. *18* and *58* are listening and ringing keys.

759,641—Signaling apparatus for telephone switchboards. E. H. Smythe.

This is a system of signalling in so-called "divided multiple" exchanges. In such exchanges the subscribers are all divided into groups, each group having multiple jacks on all the switchboard sections of its own group and one such jack on one section only of each other group. Each line has

two or more signals, formerly polarized annunciators, whereby he can signal to the operator at one group or another, according to the location of the subscriber with whom he desires to converse.

Mr. Smythe's invention relates to the signals for such a system. It particularly sets out means whereby the subscriber if he has given a false signal may withdraw the same and set a correct one.

The usual substation and cord circuits of a common battery relay system of the Bell company are shown, with the addition of a lamp relay in the cord to close the lamp return to the battery, and calling keys *a* and *b* at the substations. These calling keys simply ground the two sides of line at will, each breaking the metallic circuit in so doing, but each making the metallic again before taking off the ground, for a purpose that will appear. At central each line has two relays, *c* and *d*. When key *a* is used the relay *c* takes current from battery *g* through lamp *k'*, but this does not light the latter as the resistance in the circuit is too great. Relay *c* then pulls up its armature and closes points *f* to ground, shunting relay *d*, as shown, and lighting the lamp *k*. This remains lighted after the key *a* is released by the subscriber, because the key makes the metallic circuit before it breaks the ground, and the circuit then comes into central by the other line wire and so to ground. If a wrong signal has been given the other key *b* can be pressed, when the ground is taken off wire *1* and put on wire *2*, hence lamp *k'* lights at central in place of *k*, which goes out. If no signal is desired the subscriber hangs up his receiver, and as the hook breaks the metallic circuit all bets are off. After a call, when a plug is inserted, cut-off relay *h* gets current and again all connections are off.

The patent is the property of the Western Electric Company.

759,697—Telephonic apparatus. Alfred Graham.

Mr. Graham is an Englishman and has offended before. If my recollection serves, he had a waterproof ship telephone set the last time. This time he has the same thing, but with improvements. The figure is a section through the combination, but does not show the ear tubes, made like speaking tubes and one on each side, one being rigid and working the switch of the instrument.

In a waterproof casing of metal a rear opening is made having a receiver inside it, and on the front of the casing a transmitter is mounted to revolve, this also in a waterproof manner. The switch is worked by a transverse spindle *46* actuated by the ear tube referred to. There are a number of mechanical details.

759,741—Electric block signalling and telephoning system for railways. C. G. Otwell and I. H. Melvin.

This has the rails insulated at intervals to make sections. Each locomotive or car carries a pair of trailers connected in the cab by a circuit containing a bell and having a telephone that can be cut in. If two locomotives come into the same block both bells ring and the engineers can talk.

759,762—Signalling apparatus for telephone switchboards. E. H. Smythe.

Another one of Mr. Smythe's, assigned to the same Western Electric Company. The subject is the same as in the last patent—signalling in divided multiple systems. The same pair of lamps and a similar pair of relays are shown. Each relay breaks the other's circuit here, however, instead of shunting it.

759,771—Signal apparatus for telephone switchboards. DeWitt C. Tanner.

Mr. Tanner is of the firm of Barton & Tanner, attorneys for the Western Electric Company of Chicago and elsewhere. It need scarcely be said that this corporation owns the patent. The invention consists of a lamp signal circuit having the line lamp of the calling line of a pair to serve as a clearing out signal. The lamp of the called lamp is shunted out.

In the diagram the line on the left is supposed to call. The relay *a* takes current from battery *b* and pulls up its armature to light lamp *d* in a local circuit *4-3-b*. When the answering plug *f* is inserted in the jack *c* the cord conductor *7* is connected to the wire *4* and the lamp is shunted out, being thereafter jointly controlled by the two relays *a* and *h*. *h* is in the side of the cord toward the called subscriber, and *a* is the line relay of the calling subscriber, so the lamp *d* will only light when both subscribers have hung up and the armatures of both relays are back. Battery *b'* then sends current through a circuit made up over conductors *7* and *4* and the ground.

When calling plug *g* is inserted lamp *d* of the called line (on the right) is shunted out, but a portion of battery *b'* is connected through the resistance *k* to raise the potential of the test rings.

759,836—Generator for telephone calls. E. H. Strauss.

A generator of common pattern, having electromagnets for the field instead of permanent magnets, and a battery for energizing them. A pair of overhanging springs close the battery circuit in use of the machine, being forced together by the cam spindle on the shaft as the regular shunt is broken.

THE MAYOR AND THE MISS.

Astute politicians will neither envy nor pity Mayor Weaver of Philadelphia for the plight he has got himself into. He has a controversy with Miss Marie McLaughlin, a telephone operator, eighteen years old, and accounted pretty. The young lady is said to have uttered "a silvery laugh" when the mayor inadvertently dropped a silver dime into a nickel-in-the-slot telephone, and then just because he was the mayor demanded, "Make that connection for me immediately."

There are two accounts of what followed. The youthful operator said she kept on repeating "Drop a nickel." "Friends of the mayor," besides playing up the irritating quality of her laughter, claim that she threw in an unnecessary remark to the effect that "rules is rules," and committed lese majestaetsbeleidigung by opining that "no mayor could boss her." There is no doubt, however, what happened after that. His honor threw out all the telephones in the city hall, and as an incident in the restoration of the status quo the telephone company discharged the young lady.

Now she says, "If my father will let me, I think I shall begin suit against the mayor." Whether she does nor not, he is in for an unhappy time. People like to see even the plain, private citizen stand up unabashed in the presence of the divinity that doth hedge about a throne. And when the citizen is not plain at all, but pretty—a miss with the prerogatives and comeliness of eighteen summers—they will not entertain at all the possibility that she may have been "sassy."

There has been some doubt as to whether the Philadelphia mayor was a practical politician or a reformer. The controversy seems to settle that. It takes a reformer to get into such a predicament.

The telephone is one of the greatest inventions of the age. It has completely annihilated distances and has so completely adjusted itself to business necessities, social requirements and household demands as to make it practically indispensable in every place of business, every social club and every household.

QUESTIONS AND ANSWERS

Conducted by J. C. Kelsey, Purdue University, Lafayette, Indiana.

We are considering a proposition from some grain dealers in a neighboring county seat, twenty miles distant, to furnish them telegraph service for a period covering five months. We are familiar with the use of the telegraph over our telephone wires, and think we will have no trouble from that source.—J. S., Mo.

Brokers pay $30 a year per mile between two such cities as St. Paul and Chicago. The Associated Press pays $15 a year per mile for such service privileges around in the smaller localities, where an important daily newspaper is published. For a distance of twenty miles, a charge of $1.50 per mile per month would be low. As your telephone message charge is possibly twenty-five cents, it means the equivalent of 600 messages in five months' time, and you have to maintain the line anyway. The sale of by-products keeps many companies from the receiver, and the same rules govern the telephone business.

In our city, one has the choice of a single party Independent service and the Bell four-party residence service, at the same price. As I have business of a private nature, it is important that I have service that permits of no eavesdropping. Over the single party line, upon placing the receiver to my ear, I can hear all the conversation of the town, or neighborhood. This leads me to believe that the town or neighborhood must be able to hear all that is said over my line. Is this true? The four-party service is quiet, but there is a likelihood that the other three parties on the line will hear what is being said over the line. Is there any way that I can detect eavesdroppers? Which service is preferable?—M. W., Pa.

The single party service must be common return, which gives the possibility of such general cross talk. It is certainly true that people can hear you if you hear them. It is the shrill talkers that you hear the plainest, and you could talk unheard if you spoke in a low, even voice. On the party line, you can hear other listeners, sometimes hear them breathe, or rub the transmitter. But with a good selective ringing device, only the party asked for responds, as the other three subscribers have no way of knowing a call is being made. I believe in party line service, and from experience can say that it is perfectly satisfactory, after you are accustomed to the idea.

A long toll line has just been built into our vicinity, and we have the privilege of connection. We have a common return system, with apparatus so arranged that the insertion of a plug leaves one of the line drops in service. A trial connection with this line has led us to believe that we cannot connect directly with our subscribers, on account of the noise caused. What is wrong, and how will we remedy it?—A. P., Ky.

In the first place, a common return line is an unbalanced line, because the return side has much less resistance than the line side proper. This, of itself, will make such a connection noisy, particularly if the toll line passes through cities where strong electric induction affects it. If the series drop were placed on the return side during the toll connection, a balance might take place. But series drops in talking connections is not good practice, especially for long distance talking, where every advantage is needed. For local service purely, a series drop will do, but the use of a bridging drop in the cord circuit as a clearing out drop is much more reasonable, and much more adaptable to all kinds of service. To make conditions better, the toll cords should be provided with repeating coils, and repeating coil keys, so arranged that a coil could be used when necessary, and thrown out of service when not in use. A well-designed repeating coil will not be detrimental, and the added quiet that it causes will more than offset the noise caused in its absence. Ofttimes a repeating coil is useful in reducing the volume of the sound, and making conversation clearer. To use a repeating coil, and a bridging drop, some difficulty would be met about the drop falling. A condenser placed at the middle points of the coil on one side would greatly assist the drop in responding to a clearing-out current.

Why is the relay which governs the supervisory lamp in common battery systems non-inductive? The Bell system uses a non-inductive cord relay, and so does the Kellogg system, more familiarly known as the Dunbar system, and also some forms of Stromberg-Carlson systems, in which a condenser serves the purpose of the idea placed in parallel with the winding.—J. S., N. Y.

A relay, or electro-magnet, is a coil of insulated wire surrounding an iron core, having an armature so arranged as to be attracted to, or fall away from, the core, during use and disuse of the circuit, controlling contracts, which open or close lamp, or signal circuits. An electric current passing through the coil of wire causes a magnetic field, which exists in and about the coil. The intensity of this field is proportional to the volume of the current in the coil and to the number of turns in the coil, and is also greatly augmented by the use of an iron core in the coil. The magnetic field caused by the current passing through the coil represents stored up energy, taken from the current flowing in the circuit. But magnetic energy cannot be permanently stored up, for the magnetic field is resisted by some force, and as soon as the exciting force is withdrawn, the stored-up energy is forced back in the circuit. Therefore, the starting of an electric current through a magnet coil, and the increasing of the current through the coil, are resisted by the medium surrounding the coil, and any rise in current value is retarded, or held back, because it takes time and work to overcome the resisting force of the medium surrounding the coil. This applies to the decrease in current value, or complete cessation of the current, because the stored-up energy has to be returned to the circuit. It takes time and work to do this, and something is lost each time the current is raised and lowered.

The resisting force of the coil depends upon the rate in which the currents tend to change. If the currents are changing slowly, they meet with little opposition. If changing rapidly, they meet with great apparent resistance. As the voice currents are composed of currents which change slowly, and some that change very swiftly, it is plain to see that the main tones, or volume producing tones, pass more readily than the higher frequency, or quality producing tones, if a series magnet is placed in the talking circuit. The higher tones may be said to arrive too late to round out the lower tones and make them intelligible.

The Bell non-inductive cord relay is composed of two windings, eleven ohms of copper and 100 ohms of german silver, wound on the exterior of the copper winding, of few turns, and so far away from the core as to have no inductive, or energy producing value. The 100 ohm winding does not weaken the ten ohm winding so very materially, so it still has the power of attracting an armature, when direct current flows through it, as when the subscriber removes the receiver from the hook. The talking, or al-

ternating currents that are generated at each subscriber's station are superimposed upon this direct current, and pass through the non-inductive relay. Being alternating in character, they abhor a path of many turns, and prefer a more direct route, which is the non-inductive german silver route. Therefore, no magnetic energy is produced, because the turns are so far away, and so few in number, hence the high and low frequency voice currents pass through the winding, suffering unequal losses.

If the relay winding is paralleled by a condenser, the same non-inductive path is provided, because the capacity of the condenser balances the self-induction of the relay. As the self-induction retards the high quality notes more greatly than it does the lower volume notes, thereby causing a distortion of the original sound wave, so does the condenser favor the high tones, and holds back the lower notes. If the self-induction holds back the high notes more than the low notes at the same speed as the condenser holds back the low notes, and favors the higher ones, it is plain that when the voice currents pass through the combined path the high and the low notes are together.

The differential relay of the Dunbar system is composed of two windings of equal value, having the same relation to the core, by being alternately superimposed upon the other. If the coils were wound on the ends of the core, lines of force, or magnetic energy would be set up in each end of the core. The currents flowing set up what might be called positive and negative magnetic energy, at least having a different direction. A neutralization would tend to take place, but does not completely do so, as some of the lines of force do not have time to thread through the opposite coil, hence there is some energy given back to the line. This is self-induction plainly and carries with it the evil, distorting effect upon the voice currents.

To cause complete neutralization, it is necessary to wind the coils in such a manner as to cause the neutralization effect to take place between the influences which tend to produce magnetic lines, thereby precluding the chance of any lines being generated at all. By the superimposed winding, each turn of one winding acts on the turn of the other winding, thereby avoiding self-induction, and making the magnet entirely non-inductive.

The shunt type is the simplest device, and is very effectual, as it reduces the range through which the Bell system can operate. Not over 750 ohms of line resistance can the system be operating without auxiliary re-enforcing devices.

The condenser paralleling method is effectual, but has a tendency to unbalance a circuit, unless equivalent resistance is placed on the opposite side of the circuit. The shunt type has the advantage of having a low resistance, and can be placed on one side of the circuit without causing noise due to unbalance. However, there are localities where the ten-ohm relay will throw a line clear out of balance. The differential type is harder to design, and its operation limited to certain conditions. However, the windings must be concentric or superimposed.

At first glance, this looks like a counterpart of Mr. Dean's inventions along common battery lines. The standard Kellogg common battery instrument has no induction coil, simply a retardation coil of twenty-five ohms resistance. It is placed in series with the transmitter, and the main battery at the central station, with the receiver in parallel with the retardation coil. The ever necessary condenser in common battery practice is present, although in series with the receiver, with this combination in parallel with the twenty-five ohm retardation. In speaking into the transmitter, the waves are set up, which pass through this twenty-five ohm retardation, and set up corresponding magnetic fields proportionately. If we consider one impulse set up, it rises slowly through the impedance as the transmitter is reduced in resistance by the impingement of the voice. As the transmitter recovers itself, this stored-up energy has the privilege of expending itself into the outside circuit, or talking circuit. The stored-up energy dissipates much more quickly than it was set up, therefore, a higher electromotive

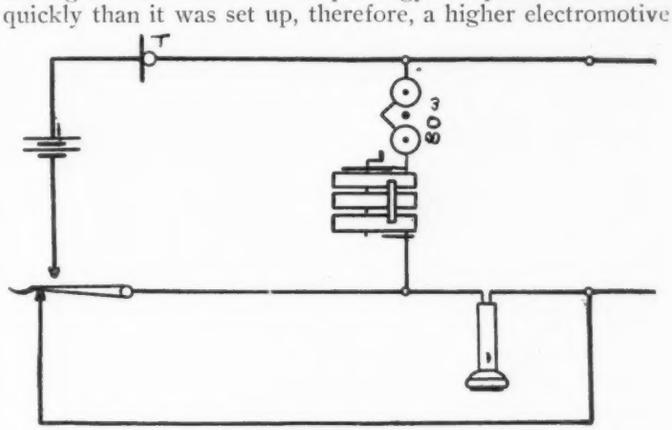


FIG. 1.

force is generated at the terminals of the retardation, which is just what is wanted. That is why the induction coil is used, to give the low starting electromotive force a higher value, so that it would reach farther.

Looking at the series local battery counterpart, you speak into the transmitter. Immediately a current tends to flow through the eighty ohm impedance. But it takes some time, and is low in reaching its full value. But as the transmitter falls to normal, the stored-up energy in the eighty ohm impedance is given back to the line much quicker than the line gave it to the coil. As the speed of this action is a factor in electromotive force, a much greater pressure will be generated by the impedance, which is the same effect as a step up transformer, or induction coil. The eighty-ohm coil will generate an alternating current of high pressure, exactly as the induction coil does it. You might make a test by lowering the resistance of the series bell, or giving it more iron in the core. Then a greater current would flow in the lower resistance circuit, and a greater pressure of self-induction could be furnished to the talking circuit. As far as I can see, the eighty-ohm bell will perform identically the same functions as the induction coil, and I have no doubt that you will be successful in long distance transmission as well as local.

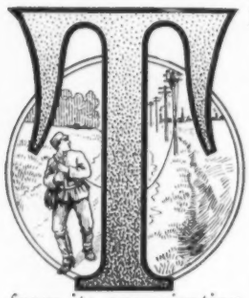
INDEPENDENTS WINNING AT KANSAS CITY.

The new Kansas City Home Telephone Company is meeting with great success in its fight against the Bell company in that territory. The most influential associations of business men in that city have decided to discontinue the use of the Missouri and Kansas (Bell) service and hereafter to support the Kansas City telephone company service only. Among the associations that have taken this step and ordered the removal of the Bell instruments are the Retail Druggists', Retail Grocers', Liverymen's, Master Plumbers', Undertakers', Jackson County Medical Association and the Missouri Academy of Medicine. The Homeopathic physicians are ready to fall in line and this will make practically every physician in Kansas City, Missouri, and Kansas City, Kansas, subscribers for the Home telephones only.

The growth of the Kansas City Home Telephone Company has been one of the wonders of the Independent movement, and the great property is a lasting monument to the sagacity, business ability and "get there" qualities of Messrs. Barber, Snider and Brailey, the originators and promoters of the plant. It is the acme of telephone development and should be held up as a model and pointed to with pride by every man, woman or child who is interested in Independent telephony.

The Automatic at Grand Rapids

C. E. TARTE

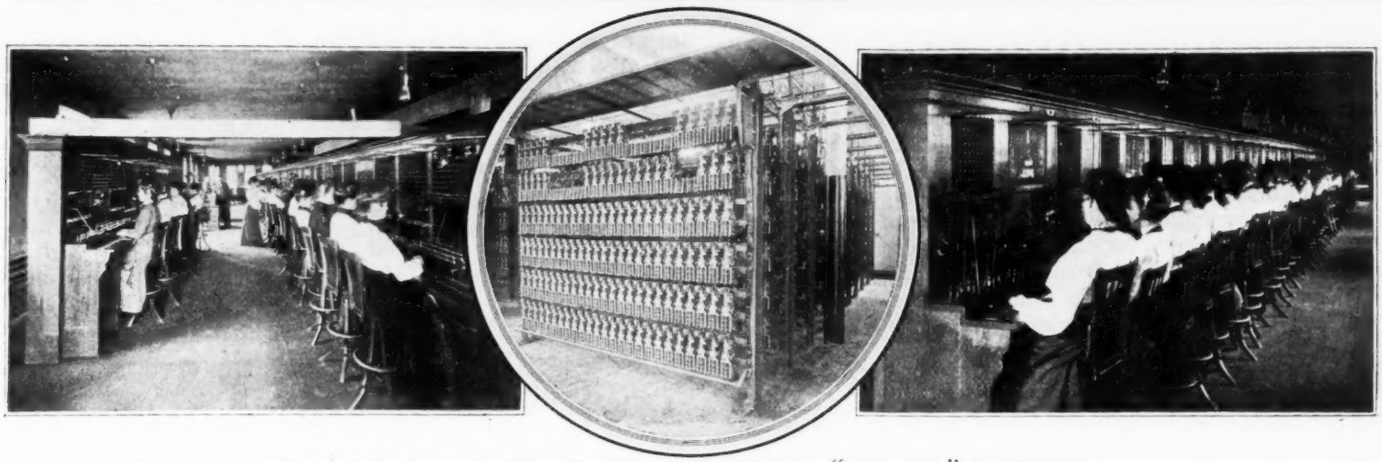


THE Citizens' Telephone Company of Grand Rapids, Michigan, has been recognized by Independent telephone operators for a number of years as one of the most progressive, as well as one of the largest, Independent telephone companies in the United States. Located in one of the busiest cities of the west and surrounded by a wealthy and rapidly growing territory, the company has from its organization shown a phenomenal increase in businesss. A few figures will show how remarkable this growth has been: The company was organized September 13, 1895, with a capital stock of $100,000. It began to give service to 832 subscribers on July 1, 1896; on January 1, 1897, it had 1,776 telephones in operation; January 1, 1898, 2,100 telephones; January 1, 1899, 2,525; January 1, 1900, 3,119; January 1, 1901, 3,435; January 1, 1902, 3,794; January 1, 1903, 4,927; January 1, 1904, 5,132.

The above figures refer to the growth of the exchange in the city of Grand Rapids, but, in addition to this, the company has been expanding and extending its service to different points throughout the state of Michigan, and its outside growth has been quite as remarkable as that in the city of Grand Rapids proper. A large number of exchanges have been built and others have been bought and added to the system; long distance lines to connect these exchanges to the Grand Rapids exchange have been constructed. The company owns an exchange at Lansing which has 1,784 subscribers, another at Traverse City with 1,116 subscribers, and there are a number of smaller exchanges, each with from 200 to 700 telephones in operation, altogether making a total of approximately 10,500 telephones outside of Grand Rapids proper. Twenty-two hundred miles of metallic toll line circuits are owned and operated by this company. The majority of these lines are built of copper wire, and it has been the policy of the company during the last two years to use nothing but copper in the construction of its toll lines.

The Citizens' Telephone Company owns considerable stock in the Citizens' Telephone Company of Muskegon, Michigan, and is also represented on the board of directors of the latter company. The Calhoun County Telephone Company of Battle Creek, Michigan, is managed and operated by the Grand Rapids company. The Jackson Citizens' Company, Jackson, Michigan, is also closely allied to the Grand Rapids company, the secretary and general manager

THE SUBSTANTIAL HOME OF THE GRAND RAPIDS EXCHANGE.



VIEWS OF THE DESERTED MANUAL BOARD AND ITS "GIRL-LESS" SUCCESSOR.

and board of directors of both companies being the same. The officers of the Citizens' Telephone Company of Grand Rapids are as follows: Directors:—Charles F. Rood, president; Edward FitzGerald, vice president; E. B. Fisher, secretary; William J. Stuart, treasurer; Philip Graham, C. E. Perkins, L. J. Rindge, E. G. Studley, J. B. Ware, Gaius W. Perkins. The active management of the company is in the hands of E. B. Fisher, secretary; C. E. Tarte, general manager; Albert Stacey, superintendent of construction; Edmund Land, superintendent of equipment.

Prior to January 9, 1904, this company had been operating a magneto transfer type switchboard in the city of Grand Rapids. This board had been operated to its full capacity for some time and it became necessary for the company to install new equipment. After a thorough investigation of the product of the manufacturers building Independent equipment throughout the United States, it was decided to install an automatic exchange, and a contract was let to the Automatic Electric Company of Chicago in December, 1902, for complete equipment for 5,000 subscribers' stations, the switchboard to have an ultimate capacity of 19,000. It was necessary for the company to build a new house and a site was accordingly purchased between Louis and Campau streets, on the east bank of the Grand river. A cut of the new building is here reproduced. It occupies a space 77x143 feet, and is built of red brick. There are two stories to the building and a very large basement, which is almost entirely above ground. This basement contains furnace, coal rooms, etc., the larger part of it being used as a supply department for the company. Under the west side of the building and next to the river a driveway runs and all freight is delivered from this driveway; the teams coming in from one street and going out on the next are entirely protected from the elements while loading and unloading freight.

The front half of the first floor of the building is occupied by offices. A public waiting room has been established at the main entrance of the building. This room is finished in marble wainscoting forty-five inches in height, with tile floor to match. At the right of this waiting room are the offices of the secretary and general manager. In front is the general office of the company (45x38 feet), which is occupied by the auditor and his force of clerks. To the left and extending down a corridor on the east side of the building are the offices of the superintendent of construction, the local manager, the superintendent of equipment, etc. All of these offices are furnished in dark oak and present a very handsome and comfortable appearance. The rear half of the first floor is used as a workshop—a little factory as it were. The space devoted to this use is 64x75 feet; it is perfectly ventilated and well lighted. This company does all of its own repair work, makes all of its own cable boxes and is well equipped to take care of all the work which may be sent in from its numerous outside exchanges, as well as that which comes from the city proper.

The second floor is devoted to the automatic exchange. The automatic switchboard, distributing frame, storage battery plant, "telltale" board, power apparatus, air compressor, etc., are located on the front half of this floor. In the rear will be found the toll room, the trouble department, the lockers for trouble men and toll operators, reception room for toll operators, dining room, kitchen, etc.

When the company began to prepare for the installation of the automatic exchange, it was found necessary to rewire every subscriber's station, changing the circuits and rewiring all of the branch exchange switchboards, install a great amount of underground and aerial cable, do away with the knob installations in the city, and, in fact, do considerably more work than would have been necessary to install a new exchange. It was necessary that this work should be done without in any way interfering with the subscribers. This task was begun in March, 1903, and was completed prior to January 1, 1904. The Automatic Electric Company completed its part of the installation of this board toward the latter part of December, 1903, and it was decided to make the cutover on Saturday, January 9. The subscribers were notified to discard their old directories at 12 o'clock on that date and to make their calls over the automatic telephones. The company had for some time instructed its patrons in the use of the automatic telephone and everything was in readiness on the day that the cutover was to be made. The cables of the old exchange had been tapped onto the new cables in the rear of the distributing board in the automatic exchange and ordinary wooden toothpicks had been inserted between the heat coil and the line terminal springs on each side of the subscriber's line. When everything was ready for the change, the old cables on the rear of the board were cut by one force of men, while another force withdrew the toothpicks from the heat coils on the front, and connections were instantaneously made between the switches and the subscribers' lines. The automatic switchboard, which had been dormant during the forenoon, suddenly awoke as several thousand curious subscribers began to test their instruments. It was found that at one time during the afternoon 1,500 telephones out of a total of 5,000 were in use. This estimate was made by inspecting the connector shelves. The automatic switches handled this business with great ease, and it is claimed by the manufacturers that it would have been impossible for the most modern manual equipment to have accomplished this. The entire time consumed in making the cutover, after everything had been in readiness, was less than ten minutes.

Most of the readers of TELEPHONY are familiar with the Strowger automatic telephone and its operation, but for those who have neither seen nor used this telephone, we

are reproducing an illustration of the telephone and also of the automatic switch. It will be noticed that there are ten finger holes around the outer edge of the dial on front of the telephone box. These holes are numbered from one to ten and the dial is rotated by placing the finger in one of these holes and pressing downward toward the left until the finger reaches the stop just below the dial, when it is withdrawn and the dial is returned to its normal position by a spring. A certain number of electrical impulses are sent over the lines from the telephone to the switch corresponding to the number of the hole in which the finger is placed when the dial is rotated. We will say that number 1,234 is called. The first movement of the dial with the finger in number one sends one impulse over the line, operating a first selector switch, which selects a trunk line leading into the group of switches known as the "1,000-group." Each thousand group of switches is divided into ten groups of 100 each, and the second movement of the dial with the finger in number two operates a second selector switch, giving the trunk line leading into group 200 of group 1,000 already selected. The last two movements of the dial with the finger in number three and four give the units and tens of the call and complete the connection with the lines of subscriber number 1234. The hanging up of the receiver disconnects and restores the three switches to their normal position. This clearing of the switchboard is one of the most unique features of the system. It is absolutely reliable and instantaneous and saves much time in the operation of a busy exchange. The Citizens' Telephone Company was the first to be equipped with a special long distance dial; this dial has an extra hole above the cipher which is marked "Long Distance." A revolution of the dial with the finger in the "Long Distance" hole immediately gives the subscriber the ear of the long distance operator.

On the automatic switchboards the first selector switches are mounted on shelves of twenty-five each and these, with the necessary second selectors and connectors, are mounted in groups of 100 each. Ten of these groups make a complete section of 1,000 lines. There are five of these 1,000 sections installed. Directly in front of the middle 1,000 section is found the "telltale" board. In case a heat coil blows on any of the switches, a lamp is immediately lighted on the telltale board and a magneto bell starts to ring, thereby calling the attention of the switchboard man to the fact that something is wrong. There is one lamp for each group of 100 first selectors and the attendant knows at once where to go for the trouble. At the 100 groups there is an individual lamp for each shelf of twenty-five first selectors, which also lights, and as soon as the attendant reaches the particular 100 that the trouble is in he can then, by means of the shelf lamp, locate and remedy the trouble with very little delay.

In connection with the "telltale" board, there is also a generator lamp board. Ringing current for each group of 100 is carried through two lamps at this board, and if a line is grounded or short-circuited in any group, the lamp of that group will light when the ringing current is sent out on the line, thereby calling the attendant's attention, so that the trouble may be remedied.

Power apparatus includes two Sprague 4.1 horsepower dynamotors for charging storage batteries. These machines are run from 220-volt direct current and deliver seventy-five volts to storage batteries. There are two Holtzer-Cabot, type E, ½-horsepower motor generators. They are run from 220-volt direct current and deliver seventy-five volts on the ringing side. A small supplementary Holtzer-Cabot dynamotor, made to run from fifty-volt direct current (storage battery) is provided to do the ringing Sundays and nights. The power switchboard, of pink Tennessee marble, is provided with voltmeter, ammeter, underload and overload switches, automatic starting boxes, etc. Two battery interrupters, for the purpose of furnishing current to rotate the automatic switches, are provided. These interrupters are directly coupled to two Sprague ¼-horsepower motors.

An air compressor, to be used for the purpose of blowing dust out of the switchboard, has been installed. Pipes from the air compressor are run to each group of switches and a nozzle provided, so that a flexible rubber hose can be attached. The compressor tank is tested to 150 pounds pressure and is run by an electric motor provided with an automatic regulator, so that it is regulated between a pressure of sixty and eighty pounds.

The storage battery plant consists of two sets of twenty-six cells each of American Storage Battery Company's 400 ampere-hour cells. In addition to this there are two sets of twelve cells each of chloride accumulator, used to furnish current for the toll boards.

All cables entering the building are brought in through a tunnel 210 feet long. This tunnel is built of concrete and is six feet six inches high and three feet ten inches wide. It extends from the new building up Louis street to a manhole at the corner of Louis and Campau streets. At this corner the old underground system is reached, and this is the place where the splices and changes were made to cut the lines out of the old exchange into the new one.

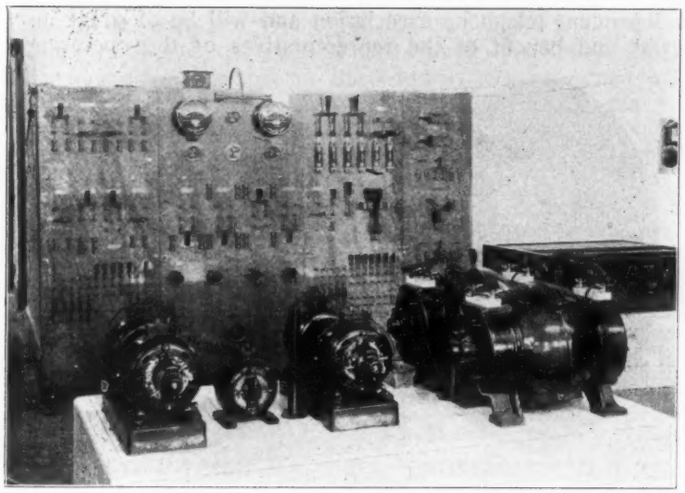
It was necessary to change each cable, and, in fact, each pair of wires, one at a time, as the entire cutting over of lines was made while the telephones were in service and without interruption to the service. The method of handling the cutover has been as follows: Permanent cables were run through the tunnel from the manhole at the corner of Louis and Campau streets to the distributing frame in the new building. Temporary cables were then run from the distributing rack to the old building, and as soon as a pair of wires was cut into the new cables, they were jumped back to the old office through the temporary cables and connected up before the old tapes were taken off. In this way the changes were made without inconvenience to subscribers. Cables are brought into the east side of the building from the tunnel and carried from the basement to the second floor by means of pockets built in the side of the wall.

A Cook distributing board, equipped with 8,875 terminals on the line-cable side and 5,250 combined sneak-current and lightning arresters on the central-office side, has been installed. The terminals on the line side are in groups of 25-pair, mounted 225-pair high, and on the central-office side in groups of 25-pair mounted 175-pair high. After going through the distributing board, the lines are carried into a multiple cutoff section in the toll room, and from there are carried into the automatic switches.

General Manager Tarte's pet hobby is the development of the toll-line business, and with the idea of taking care of future as well as present business, a complete, well-equipped, up-to-date toll-line board has been installed. The growth of this part of the business for the last five years has been remarkable, and it is expected that with better facilities for handling the work and with more lines where needed, a large increase will be shown in the volume of business during the next twelve months. On Saturday, January 9, the day on which the change from manual to automatic was made, more than 500 messages were handled through the new toll board between the hours of 12:30 and 8 p. m. Business for the last year has been so congested that it has been almost impossible to handle it, but it has nevertheless shown a steady gain. Operators have been overloaded with work, lines have had more business than they could carry, and there has been no chance for relief, because if new lines had been built there was no room on the switchboard to bring them in and no possibility of adding any more positions. In the toll-line department there were 112,502 messages in and out of Grand Rapids in

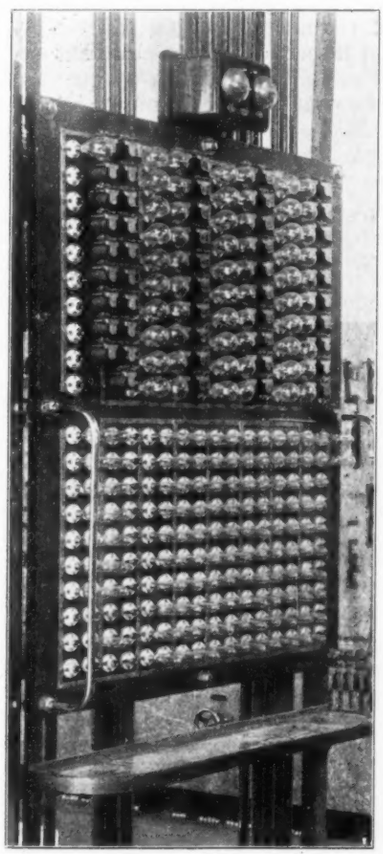
1899; 165,265 in 1900; 195,561 in 1901; 259,650 in 1902, and 306,619 in 1903.

The toll board proper, which is manually operated, has twenty positions installed. The first and second positions are the local switching section. All of the local exchange lines are brought from the distributing board to this section,



POWER BOARD. RINGING AND CHARGING MACHINES.

which is practically a multiple section, before they are carried to the automatic switches. This section is equipped with 5,400 multiple jacks and has a capacity of 10,500 lines. The third position is a test panel. The individual wires of all toll lines are brought into separate jacks at this board, and the tip and sleeve wires from the switchboard side are also brought to individual jacks. Galvanometer, twin plugs, testing keys, etc., are provided for the purpose of facilitating the testing of lines. The fourth position is vacant. The fifth, sixth and seventh positions are recording positions. Eighth position is a "through" board, i. e., a board at which all "through" business between outside lines is handled. Ninth to twentieth positions, inclusive, are regular toll positions, i. e., positions where business between local subscribers and toll lines is handled. Twenty-first and twenty-second positions are for rural lines, of which there are 150 entering the exchange. In the center of the toll room are located three two-position desks. The first desk is the toll chief operator's desk and the other two are information desks. All of the apparatus in the toll room was furnished by the Kellogg Switchboard & Supply Company, Chicago.



TELL TALE BOARD.

The desks and switchboard are finished in quarter-sawed oak and the entire installation is first class in every respect.

The method of handling a toll-line call is as follows: When an automatic subscriber desires conversation with a toll subscriber, he pulls down the "long distance" finger-hole on his dial and then presses the ringing button on his telephone. This lights a lamp on a trunk line at the recording-toll position, and the recording operator plugs in on the jack associated with this lamp. After the recording operator has found what is wanted she tells the local subscriber that she will call him when she gets his "party." When the automatic subscriber hangs up his telephone he automatically releases the trunk line and restores his own line to normal condition. The recording operator makes out a slip containing the desired information and passes it, by means of a messenger, to the proper toll operator. When the toll operator is ready to complete the connection, she will talk over the proper order-wire key to one of the switching operators at the multiple section, and tell her what number she wants. The switching operator will designate the trunk line, will test the number wanted and will put the trunk plug into the proper jack. The switching operator then throws over a key associated with the trunk cord, and this puts out a lamp at the toll operator's position, indicating to her that she can ring the subscriber and complete the connection. The toll operator has complete control of the switch, and when the local subscriber hangs up his telephone a supervisory lamp associated with the cords at the toll operator's position will light. When the toll operator is through with the switch and takes her plug out of the trunk jack, a signal is given to the switching operator to take down the switch. If the line wanted is busy, the switching operator puts the trunk plug into a jack that has the "busy buzz" on it, and leaves it there until she gets the signal from the toll operator to take down the connection. Incoming toll business is handled the same as described, with the exception of that part handled by the recording operator.

Adjoining the toll room is the operators' locker room, equipped with expanded-metal lockers. The reception room and the dining room, which the company has provided for the use of operators, are next to the locker room, in the southwest corner of the building, and are finished in weathered oak, "Old Mission" style, and there are fine settees, rockers and reclining chairs with heavy leather seats. The walls are tastefully decorated with numerous pictures. In connection with the dining room is a kitchen, well equipped with gas stove, sink, etc., and a matron is constantly on duty to look after the wants of the toll-line operators.

General Manager C. E. Tarte recently furnished the following statement showing the comparative cost of operating a manual and an automatic exchange. The month of November, 1903, was used as the basis for cost of operating manually, and the month of March, 1904, as the basis for cost of operating automatically:

MANUAL.

5,125 Telephones in Service in Month of November, 1903.

		Per month	Cost per year.
1	Traffic manager	$ 80.00	$ 960.00
1	Day chief operators	40.00	480.00
1	Evening night chief	35.00	420.00
2	Day monitors, $30.00 and	25.00	660.00
1	Evening monitor	25.00	300.00
1	Clerk (timekeeper, etc.)	30.00	360.00
2	Day inform'n clerks, $30.00 and	25.00	660.00
2	Noon and evening information clerks at $28.00 and	23.00	612.00
	Matron	30.00	360.00
*68	Day operators (57 positions, 8 extra relief, 3 extra) at	1,458.00	17,496.00
†42	Noon and evening (36 positions, 6 extra relief)	720.00	8,640.00
‡ 5	All night at	120.00	1,440.00

1 Switchboard man	75.00	900.00	
1 Switchboard man	55.00	660.00	
1 Night switchboard man	50.00	600.00	
1 Rackman at	50.00	600.00	
			$35,148.00
1 Wire chief	$ 70.00	$ 840.00	
Assistant wire chief	50.00	600.00	
Clerk	40.00	480.00	
3 Trouble men at	60.00	2,160.00	
5 Trouble men at	55.00	3,300.00	
2 Trouble men at	50.00	1,200.00	
1 Supply boy at	30.00	360.00	
			$ 8,940.00
MAINTENANCE WAGON.			
Foreman	$ 65.00	$ 780.00	
2 Linemen	60.00	1,440.00	
Wagon and driver	71.50	858.00	
RECONSTRUCTION WAGON.			
Foreman	$ 70.00	$ 840.00	
3 Linemen	60.00	2,160.00	
Wagon and driver	71.50	858.00	
			$ 6,936.00
Total			$51,024.00
* DAY.			
16 at, per month	$ 25.00	$ 400.00	
18 at, per month	23.00	414.00	
16 at, per month	20.00	320.00	
18 at, per month	18.00	324.00	
			$1,458.00
† NOON AND EVENING.			
24 at, per month	$ 18.00	$ 432.00	
18 at, per month	16.00	288.00	
			$ 720.00
‡ ALL NIGHT.			
1 at, per month	$ 30.00	$ 30.00	
2 at, per month	25.00	50.00	
2 at, per month	20.00	40.00	
			$ 120.00

AUTOMATIC.

5,507 Telephones in Service in Month of March, 1904.

	Per month	Cost per year.	
1 Traffic manager	$ 80.00	$ 960.00	
(Traffic manager on the Automatic system gives most of his time to looking after toll traffic, and properly only part of his salary should be charged to local exchange.)			
4 Day information clerks at $30.00, $30.00, $25.00 and	25.00	1,320.00	
3 Noon and evening information clerks at $30.00, $25.00 and	25.00	960.00	
Part of matron's time	.....	180.00	
2 Day switching operators at multiple section	25.00	600.00	
1 Evening switching operator	.....	276.00	
1 Chief switchboard man	80.00	960.00	
1 Switchboard man	75.00	900.00	
1 Switchboard man	70.00	840.00	
1 Switchboard man	60.00	720.00	
1 Switchboard man	55.00	660.00	
1 Rackman	55.00	660.00	
			$ 9,036.00
Wire chief	$ 75.00	$ 900.00	
Assistant wire chief	60.00	720.00	
Clerk	40.00	480.00	
3 Trouble men at	60.00	2,160.00	
5 Trouble men at	55.00	3,300.00	
4 Trouble men at	50.00	2,400.00	
1 Supply boy at	30.00	360.00	
			$10,320.00
MAINTENANCE WAGON.			
Foreman	$ 65.00	$ 780.00	
2 Linemen	60.00	1,440.00	
Wagon and driver	71.50	858.00	
RECONSTRUCTION WAGON.			
Foreman	$ 70.00	840.00	
3 Linemen	60.00	2,160.00	
Wagon and driver	71.50	858.00	
			$ 6,936.00
Total			$26,292.00
Saving on automatic			$24,732.00

INDIANA STATE INDEPENDENT TELEPHONE CONVENTION.

The annual meeting of the Indiana Independent Mutual Telephone Association will be held in the city of Lafayette, Indiana, June 28 and 29. If precedent can be depended upon this will be the largest state meeting held by any Independent telephone association and will be of great interest and benefit to the representatives of the operating

ROME C. STEPHENSON.
PRES.

HARRY GATES.
SEC.-TREAS.

companies, manufacturers and supply people attending. There will be able papers prepared and discussions upon topics of vital interest to all Independent telephone people. The leading manufacturers and supply men will make creditable displays of all lines of goods.

The headquarters will be at the Hotel Lahr. There will be a fine programme of entertainment, such as trolley rides, vaudeville shows, music, an inspection of the electrical and mechanical department of Purdue University, a banquet and a dance, all of which will be gratis to the members attending the convention. In addition, all visiting telephone men will be made honorary members of the Lafayette club while at the convention. The programme is as follows:

TUESDAY, JUNE 28.

10 a. m.—Registration of Delegates.

2 p. m.—Address of Welcome. Hon R. B. Sample, Mayor of Lafayette. Response by Rome C. Stephenson, President of Indiana Independent Telephone Association.

During the first afternoon three papers will be read. These papers will be on interesting phases of telephony, and will be read by prominent Independents.

4 p. m.—Trolley ride around the city.

8 p. m.—Vaudeville entertainment at Tecumseh Trail, one of the historical places of the state.

WEDNESDAY, JUNE 29.

10 a. m.—Inspection of exhibits.

2 p.m.—Three more important papers and routine convention business, election of officers, etc.

6 p. m.—Boat ride, followed by banquet at German National Park.

The Sterling Electric Company of Lafayette is sending out its usual open-handed welcome, in which it says: "As it has been three years since we have had the pleasure of meeting our telephone associates at our home, we are pleased to announce that the Indiana state convention has been called to meet at Lafayette, Indiana, our home, June 28 and 29. We wish to extend to you an invitation and assure you of a hearty welcome, in addition to the invitation extended by the association. It is the intention to have a meeting of representative telephone men, regardless of their membership in the association. We want to see every company in the Independent telephone business in the state of Indiana represented at this meeting, and believe it will be to their interest to be represented. Come whether you are a member of the association or not. There will be no charges for any entertainment. There will be no assess-

ments, but a "getting together" of all Indiana telephone men for the purpose of holding a harmonious meeting for the advancement of Independent telephone interests. We will accord you a hearty welcome and urgently request that every company in the state of Indiana be represented. Rest assured that we will use every effort to make your stay in our city both profitable and pleasant. Kindly notify your neighboring companies of this meeting and time, and request that they be present; we might inadvertently overlook them. We sincerely hope that all Independent telephone men will attend. We appeal to you to come and help make the Independent telephone movement in the state of Indiana the strongest and most united of any state in the Union."

STUDY OF THE TELEPHONE ARTIST.

When you wait and wait at the telephone for the people to answer, what do you do with your pencil? asks a writer in the Washington *Times*. Of course your mind is wishing all sorts of bad luck to the exchange girl, and your soul writhes in impatience, but your pencil is also at work.

What does it do?

You will find that it does a lot of funny things if you will stop to investigate.

Whether it be that some brain cell is first cousin to a nerve in the finger, or whether it is merely an unconscious outlet of nervous strength, the fact remains that one is apt to make strange markings on the paper before him or on the wall while lost in thought. Sometimes they are birds of the air—again beasts of the field—and now and then there will be weird and mysterious brain children, possessing neither shape, reason nor excuse.

Whether signs written at the telephone go like dreams—by contraries—or whether the science is one of strange inconsistencies, no one has said, for no one thought to consider—but at any rate it is another instance where people always do the unexpected.

The managing editor, a man little given to flourishes—surely not one to go aimlessly in a circle and who would not say "get on to his curves," is quite wedded to circles. He will make five or six violent deep ones with his dark pencil, and then will get very busy criss-crossing these with numerous bars. When you go to the desk telephone and see one of these flying dervishes you may know the managing editor has had smooth sailing in his conversation. The telephone girl has been obliging, the answer has come quickly, and all is serene. But if you find two or three you know he has had trouble. If you find a dozen growing darker and more menacing each time, steer clear of him. He is dangerous. A dozen decorations give proof positive that trouble is in store for anyone who happens in just then, consequently you put on your hat and hunt an assignment in the dim distance.

The city editor is given to animal painting. No doubt, if he had not drifted into the newspaper business he would have been a second Landseer or a masculine Rosa Bonheur. The remarkably built animals, looking as though they might belong to the species feline, is the work of his hand. He makes dozens of these, carrying on the general style occasionally by drawing a few hundred tails to each creature. When the pseudo cat possesses a bushy tail resembling a feather duster, the city editor is mad. When the cats are mono-tailed, he is serenity itself.

You would think that the sporting editor would draw muscular giants or fighting gladiators or grand stands of cheering people. But he does nothing of the sort. A few dozen solitaire games of tit-tat-tow—that frantic, blood-curdling games, ordinarily assigned to the nursery on a rainy afternoon—suffices for him.

The police reporter is given to landscapes. The touching combination of mountain and lake, big trees and sailboats, is the work of his hand. I do not mean to insinuate that he draws any other landscapes besides these. Far from it. He would like to, but he does not know the combination. Once—a long, long time ago—he started in to take drawing lessons, and his teacher told him to sketch his horizon first of all. She explained that after this mountains could go and then he could think about the beach in the foreground. He never took but one lesson, and so he has stuck to that one scene. He longs to show a storm at sea, or perhaps a whale out for an airing, or maybe a volcano working overtime, but he does not dare. He is afraid it will look as though the whale is swallowing up the volcano or that the smoke from the volcano will seem to be the whale's cigarette, or that the waves in the storm will leap over the mountain, so he rests content with his calm picture of a summer day, with all the little pleasure boats, while he is waiting for the details of the latest murder or the age of the suicide.

As for the office boy—that agile individual who has the paste pot thrown at him if things go wrong—he draws the beautiful lady. His beautiful ladies all belong to a race which believes in constancy. The beautiful lady and her little boy and her little girl, and her husband possess the same physical proportions. Once in a while, by special dispensation, the beautiful lady's feet are smaller than her husband's.

Now, you would think that the religious editor, given to much thinking, deep reading and serious thought, would copy texts for the benefit of who comes next. But such is not the case. He very carefully writes on all the paper he can find the sweet refrain, "Mary had a little lamb." Whether he is ignorant of the color of its fleece—or whether he hesitates to repeat the word—having heard it used in connection with matters other than church, none can say.

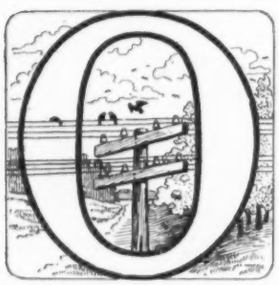
The river editor draws houses. That is, he thinks he draws houses, but others are not quite sure. At any rate, what he draws has windows and a door and some front steps, and so you may reasonably suppose that it is meant for some kind of a dwelling place. Perhaps in the course of his career he was sent to investigate a flood and saw a house that looked like that; who can say?

Then there are reporters who draw nondescript things. One would hesitate to liken them to anything on the earth or in the waters of the sea. But they must mean something. It remains for some enterprising scientist to discover the keynote.

In a business office there is apt to be something doing in the way of odd marks. But you will go far before you will find more of it than you do in a newspaper office. There are many reasons for it. In the first place, there is always a lot of blank paper near the telephone in the editorial rooms, and the man who goes to the instrument is generally prepared to write. Often he will sit at the telephone for ten or twenty minutes, and talk to half a dozen persons in that time. In the spare moment he is apt to use his pencil more often from habit than for any other reason. It matters not how much paper the scribe leaves lying about nor how much he wastes—for paper is the law of every newspaper den. The average business office is an orderly place, given to waste baskets. Such conveniences are a mad extravagance in the well-conducted newspaper concern. You will never be a really good reporter until you learn to throw everything you do not want on the floor. You often throw there many things which you do want, but that is not the point. You see the point at best when you are sitting in a mass of papers looking for the important item which you discarded. The perspective here is excellent. It is when you do not find the item that you rush to the telephone after it and—make black, deep marks.

The Independent companies have the confidence of the public.

CANNOT CHANGE RATES FIXED BY ORDINANCE.



ON JULY 1, 1896, the Common Council of Baltimore, Maryland, passed an ordinance giving the predecessor of the Maryland Telephone & Telegraph Company permission to enter the city and fixed the rates for service which the company might charge at $48 for office and $36 for residence telephones. The above company on reorganization operated under this ordinance and still continues to do so. Prior to 1903, service was furnished at the rate provided for in the ordinance. Some time in that year, however, the company decided to make a change in rates, claiming that the ordinance was meant to apply to the "grounded circuit" telephones and that it would charge thereafter $72 for the "metallic circuit" instruments. The ordinance has been tested through the Court of Appeals of Maryland, and the decision was recently given that the company must not charge a higher rate for either service than that provided for by the ordinance.

Charles Simon's Sons Co. v. Maryland Telephone & Telegraph Company, 57 Atl. 193. Decided February 24, 1904.

COMPANY WINS SUIT IN HIGHER COURT.

April 11, Judge Mandell of the Circuit Court of Detroit directed a verdict in favor of the Co-Operative Telephone Company in its suit against Peter Katus, which has been referred to in a previous issue of TELEPHONY. A large number of these cases, involving the validity of stock subscriptions to this company, depend upon the disposition of the above suit. The case is to be appealed to the Supreme Court.

COMPANY WAS NOT AT FAULT.

In a recent number of TELEPHONY the case of Florence S. Leeds v. New York Telephone Company was discussed. The suit was then before one of the lower courts of New York. The facts were as follows: The company had fastened a wire from a chimney situate on a low building across to another building at a considerable elevation. Plaintiff was walking along the street when suddenly a derrick fell across the wire with such force as to fell the chimney to the ground, throwing the bricks on her and inflicting serious injuries. In the lower court a verdict was given her against the company on the ground that it was negligent in maintaining the wire in the above way. March 22, the Court of Appeals reversed this finding. Justice Gray, in writing the opinion, said that the accident was the result of the intervention of an independent cause which the company was not bound to anticipate and without which the injury would not have happened. "The negligent conduct of the persons in using the derrick upon the building was an unusual occurrence, and not such as should have been foreseen by the defendant." The company was therefore relieved from liability. The point which decided the case in favor of the company was that the careless fastening of the wire to the defective chimney was not the *proximate cause* of the accident. Had the weight of the wire been the cause of pulling over the chimney the decision would have been different. While the company perhaps was careless in fastening the wire to the chimney it was not this particular cause which occasioned the injury.

Leeds v. New York Telephone Company, 70 N. E. 219.

PROXIMITY OF CONFLICTING COMPANIES' WIRES.

A case was recently brought to the Supreme Court of Iowa for the purpose of determining how near a telephone company may lawfully string its wires to those of another company already operating along the same street or highway. The Northern Telephone Company and the Iowa Telephone Company was each operating a line of telephone wires through the town of Alta and surrounding highways at the time the suit was brought. Claiming that the wires of the latter company were so near to it as to seriously interfere with its wires, the former company made a complaint that the other was responsible for the alleged interference. The former company having been first in the field, the one question for the court to decide, inasmuch as it was conceded that each had a legal right to a location along the particular street and highways, was how near the wires should be placed. It was decided at the trial that the defendant could not come nearer than four feet to the wires of complainant within the town and that ten inches was a reasonable distance for the country roads.

Northern Telephone Company v. Iowa Telephone Company, 98 N. W. 113. Decided January 20, 1904.

IOWA COMPANY WINS TAX SUIT.

The Supreme Court of Iowa has recently held that a telephone company which has paid taxes upon its property into the state treasury may not be locally taxed by the county assessors on the same property. This is the gist of the opinion which the above court has given in the case of A. W. Layman, Treasurer of Polk County, against the Iowa Telephone Company. The company resisted the collection of some $600 which the county had assessed against it, and suit being brought in the lower courts the company secured a verdict. The same decision has been reached in the higher courts, and the result is far-reaching and decidedly favorable to the telephone companies of the state.

Layman v. Iowa Telephone Company, Supreme Court of Iowa.

DUTY TO FURNISH MESSENGER SERVICE.

This question was discussed not long ago by the Appellate Court of Indiana. It is unnecessary to here relate the facts in the case other than that one Swoveland sued the Central Union Telephone Company of that state to recover a statutory penalty for failure to furnish a messenger at the other end of a line over which he wished to talk, whereby he alleged that he was unable to secure the party, resulting in damages for which he brought suit. The company had a regulation that it would not undertake to deliver messages and that any person who assisted in bringing parties together did so as the agent and employe of the patron

and not of the company. The question of the court was whether this regulation was valid. The court in disposing of the question whether the company was obliged to maintain a messenger service held that it was a part of the company's public duties under the facts of the case to place the parties in communication with each other within a reasonable time after its agents were informed of the nature of the service desired and had undertaken for a stipulated consideration to furnish such service. The court also said that the messenger was the agent of the company and not of the patron. The result of this last ruling plainly makes the company liable for the negligent acts of the messenger, whereas, were the messenger to be considered the patron's agent, the company would be wholly free from liability for the messenger's acts. The court said as follows, concerning the authority of the company to promulgate rules such as the one above: "Such rules and regulations as telephone companies might adopt, however, must be reasonable and cannot have the effect of relieving the company of the duties and obligations which it owes its patrons by means of its public character."

Central Union Telephone Company v. Swoveland, 42 N. E. 1035.

COMPANY GIVEN PERMISSION BY RESOLUTION TO ENTER VILLAGE, LATTER CANNOT THEREAFTER DENY RIGHT OF COMPANY TO DO BUSINESS.

April 2, 1900, the Village of London Mills, Illinois, at a meeting of the trustees passed the following resolution, which was duly recorded and became a part of the written proceedings of the municipal body: "A petition presented by the Fairview-London Telephone Circuit, asking privilege of using the streets and alleys of the village for the erection of a telephone circuit; petition granted." With this authority the company proceeded to erect a telephone line and to equip the same for business. The company had operated unmolested in the village up to August 22, 1901, when the trustees passed an ordinance, the substance of which is as follows: "All telephone lines, poles, centrals and the fixtures belonging to the same, that were established, located and used in said village on the 25th of March, 1901, and the companies, persons or corporations owning, using and controlling the same on the date last mentioned, shall be permitted to remain in the same places and as they were located on the 25th day of March, 1901, and shall have the right to continue to so use and maintain the same until the 25th day of September, 1901; provided, however, that no change of location, no alterations in use and no extensions or additions to any of said poles, lines or centrals shall be made during the time aforesaid, except by the mutual consent of the village board and other parties, which it is needless to here mention."

The direct result of this ordinance plainly placed the question of the telephone company's progress entirely in the hands of the village board; it furthermore impliedly denied that the Fairview-London Telephone Circuit had any permanent authority to operate in the village which the trustees could not revoke. To prevent the operation of the ordinance, an injunction was obtained by the company prohibiting the village from carrying out its provisions. The injunction was sustained in the lower court and the village appealed. The question for determination was what rights the telephone company acquired under the resolution of April 2, 1900. Did this proceeding create any permanent rights? Had the village any authority to revoke this contract with the company by ordinance? The Supreme Court said: "We, therefore, hold that where a village board has, by resolution, granted to the owner of a telephone line the use of its streets and alleys, in which to set poles and string wires, and where the licensee, with the knowledge and tacit consent of the village authorities, has accepted and acted upon such resolution by erecting poles and stringing wires in the streets and alleys, the license so granted becomes a contract which is binding and valid upon the parties thereto, and which cannot be revoked by the village."

It was contended that the authority in the first instance should have been by ordinance. The court said, in answer to this proposition: "Equity and good conscience require that the village of London Mills be not heard to say that this written consent must be in the form of an ordinance. It (the village) is now equitably estopped to do so." The injunction was therefore made permanent.

Village of London Mills et al. v. White et al., 70 N. E. 313.

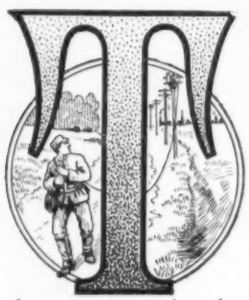
DAMAGES FOR DEATHS CAUSED BY LIGHTNING CONVEYED OVER TELEPHONE WIRES.

Several suits have recently been brought against telephone companies in different parts of the country to recover damages for deaths caused by lightning being conveyed in the above way. In a recent Pennsylvania case a large sum was obtained in a verdict given under these circumstances: April 15, a judgment of $3,000 was given the administrator of one Enoch West in a Kentucky court, who was killed by a stroke of lightning which was conducted into his house over telephone wires; a similar suit, the result of which is not known at this writing, was recently brought against the Interstate Telephone Company of North Carolina, asking $10,000 damages as the result of a death caused in this manner. Owing to the frequent occurrence of suits of this character of late the editor of this department has thought it advisable to briefly state the law which governs the liability of companies in accidents occurring in this way.

It is a general proposition that damages for personal injuries may only be obtained in the event that someone has neglected to perform a duty, the omission of which is responsible for the injuries. In the class of cases above referred to the allegation is always made, generally by charging that the companies have left wires poorly insulated or otherwise have been negligent. Often the charge is made that a company has failed to supply a safe apparatus. The first duty which the companies have, if they can escape liability of this kind, is to furnish apparatus as good as the best modern skill can produce. They are not insurers of the safety of the persons' lives who use their service and can only be made liable for the consequences arising from the operation of nature's forces when it can be shown that they have failed to supply such modern instruments and apparatus. This does not mean that the very latest invention must be immediately supplied for the protection of patrons, but only presumes that a *reasonably* up-to-date equipment shall be required. When an invention has been adopted and is in general use over the country, then all companies must install it, providing it materially lessens the dangers arising from nature's causes. If a reasonably modern instrument has been supplied no liability can arise. The case of the Western Union Telegraph Company v. Short (53 Ark. 434) is authority for the statement, that in the absence of statutory regulation fixing liability, a company is bound only to furnish suitable instruments to the degree that the skill and knowledge of the instruments is attainable in the present state of science. If there has been negligence in this regard then companies may be made to pay damages just as in other cases in which there has been failure to perform the common duty of exercising care to the end that life may be protected.

The growth of the Independent movement is the most astounding thing of modern times, and the future of the cause is one of brilliant promise, boding no good to its monopolistic competitor.

Individual and Party Lines Compared



THERE is no problem in the field of telephony to-day that is being more generally discussed, or in connection with which telephone men as a whole have a wider range of opinion than the one bearing upon the relative merits of individual line service as compared with party line service. The matter is of such vital importance—and especially at this time, when so many new Independent exchanges are being installed throughout the country—that a discussion of the subject—or, more strictly speaking, an expression of opinion—by prominent telephone men will be welcomed not alone by those just embarking in the telephone business, but by the telephone fraternity in general, as there is no man engaged in this great work who will not be glad of the opportunity to get the views of other leaders in the telephone field on this important subject, that they may profit, if possible, by the experiences of these other men.

To this end TELEPHONY, a short time ago, sent letters to a number of well-known and experienced telephone men in different parts of the country, asking each in substance the following questions:

1. What are your views regarding the relative merits of individual line service as compared with party line service?
2. Are low rates on party lines preferable to higher rates with individual lines; and which is the most desirable to the telephone company and to the subscriber?
3. In your judgment, by which service have exchanges been benefited the most?

The reply to these questions propounded by TELEPHONY was general, and the following communications on the subject, with the names of the writers, are published, which are well worth reading, as they not only bring out all the old arguments, pro and con, but throw new light on the general subject:

C. O. Harris, manager of the Utah Independent Telephone Company's plant at Salt Lake City, Utah, has attained prominence in the Independent cause, both east and west, and "speaks by the card." After a quarter of a century's experience as an engineer and manager in the telephone field, he states that he is flatly opposed to party lines, and gives his reasons as follows:

Will say in connection with the subject matter that I am squarely on record as against party lines, and am an enthusiastic talker and worker for the merits of the individual line, and see no reason why I should change my views. The party line subject is one that is attracting the attention of telephone managers everywhere and it is timely and to the point that TELEPHONY should gather and disseminate all the information along those lines that possibly can be secured, but put me on record as being opposed to the party lines. As an old telephone engineer and manager of twenty-six years' experience, I have seen the party line subject rise and fall. The downfall of the Bell Telephone Company dates primarily, and in fact to a large extent, from the date they inaugurated their party line service, which is a travesty on the name of "service," and which, if persisted in, in the writer's estimation, will cause the downfall of any company adopting it. It is an imposition on the subscribers, prevents good service from being given and is entirely at variance with those good and true principles of telephony (both in operation and maintenance) that have ever been characteristic of good telephone engineering.

The west is cursed with party line service, and I defy anyone to show me a first-class paying Bell exchange in the west, the hot-bed of Mr. Sabin and his party line service. The Utah Independent Telephone Company has the finest prospect ahead of it that has ever been formulated in this country, based on the strictly individual line unlimited service proposition. The company, its officers and employes, are as a unit in this matter, and it will take a revelation to convince us that our position is untenable. We commenced canvassing a few days since and are meeting with unqualified success in the securing of contracts at rates *one-half* of those of the Bell Company *and for individual lines*. The writer is pleased to have an opportunity of saying a few words along this line, and will have the further pleasure of expressing his views if he can secure the time to do so.

E. H. Moulton, president of the Twin City Telephone Company, Minneapolis, has figured largely in the wonderful development of the Independent movement in Minnesota. Speaking from a wide experience in this matter (he takes no stock in party lines in large cities), his statements are particularly interesting. Briefly he says:

I have very strong views in regard to party line service as opposed to individual lines in cities of this size. I absolutely take no stock in them. On account of the expense of multiple switchboards one is forced to have a number of sub-exchanges in all large cities, and in the very nature of things these make the service more or less slow. If you add the detriment produced by party lines, the situation is much worse. In the rush of up-to-date business life business men cannot be annoyed by slow service; therefore, I believe that the demand is for individual lines. In smaller cities, where the business can all be done in one exchange and where business is not so rushing, it is a different matter, and there I can readily see that a four-party line in residences and a two-party line in business would be very satisfactory.

Wilbur H. Johnston, assistant general manager of the Frontier Telephone Company, Buffalo, New York, than whom there is not a harder or more successful worker in the field of Independent telephony, nor one better prepared to speak on the subject under discussion, gives it as his opinion that, under certain conditions, the party line telephone is undoubtedly a good thing from both viewpoints—the subscriber's and the company's. He sums up the matter in the following words:

Relative to party line service—we are all learning things on this subject every day. An instrument on a party line, together with its house wiring, lightning arrester and fuse, and its service wire to the nearest pole or cable terminal, costs the telephone company as much in collecting expenses, office bookkeeping and records, instrument maintenance and interest on the investment, as does the corresponding equipment on a direct subscriber's line. It must not be overlooked that the average subscriber to cheap service is not as responsible a party and does not stay in one place as long as a subscriber who pays a higher rate. The party line man is more apt to hire his residence or place of business by the month, and to leave it, perhaps, between the hours of twilight and dawn. While at the end of any reasonable period, it is fair to assume that each subscriber will have selected a class of service suited to his requirements, it is important that in soliciting contracts, party line service should be sold only to people whose traffic will be approximately one-half, one-third or one-fourth of the traffic which a direct line may be reasonably expected to carry.

Granting that due attention has been given all the above, the saving to the company and to the subscriber in party line service is the result of dividing line, switchboard and switchboard operating charges among two, three, four or more subscribers, instead of billing all these charges to one single party. It is quite evident that if a direct line rate be $60, party line rates for two, three and four party line service at $30, $20 and $15, respectively, will be absurdly low, because only a few of all the items of expense have been affected by the change in service. It is true, nevertheless, that the saving which can be effected is great enough to make telephone service available to a great many people on party lines, who could not afford it at rates which it is necessary to charge for direct lines. In the hands of subscribers whose service requirements are proportionately limited and whose responsibility is first-class, the party line telephone is undoubtedly a good thing from both viewpoints, the subscriber's and the company's.

The traffic consideration is probably the keynote to the situation. If in a given district first-class, standard service can be given over party lines (because the traffic from each station is small), probably more revenue can be obtained, per unit of expense, in selling party line service, than can be derived from direct telephone lines. If, however, a subscriber's requirements necessitate the use of an entire line, no rate, however large, for party line service, will

make his business profitable to the company. From the point of view of the construction man, the party line is most profitable in rural communities where the cost of line wire bears a large proportion to the total expense, and in thickly settled cities where cable systems are so thoroughly installed that the only construction work necessary to the installation of an instrument, is the stringing of short service wires from the cable terminal to the subscriber's building. In small towns and villages not thoroughly cabled, maintenance expenses incident to open line wire handling—keeping pole lines in orderly shape, longest wires on top, etc.—is large enough, and waste of wire mileage is often great enough, to make the line charge for party line service nearly equal per instrument to the ordinary line charge for direct line service in the same plant.

B. G. Hubbell, president of the Consolidated Telephone Company, Buffalo, New York, ranks among the leading Independent telephone men of the country. His company uses party line telephones to a large extent for residences, but draws the line on furnishing party line service to business houses. On this subject Mr. Hubbell says:

We have been large users of party line telephones for residence purposes. I don't believe, however, in giving party line telephones for business purposes, but I feel that the largest possible number of residence subscribers can be obtained only by reasonable rates, which are possible only on party line service. In towns of from 5,000 to 10,000 inhabitants, or larger, the masses will not pay more than $12 to $15 for residence telephones and a very large list of subscribers can be gotten at that rate. It is impossible to give unlimited service on single lines at these prices, hence the necessity for party line service. Four parties on one line, for residence service, in the majority of cases, answers all requirements.

In all of our exchanges we have the greatest possible development, which numbers about one telephone to every ten people, and we feel that we could not have attained this development without the aid of party line service for residence purposes. I don't believe in giving complicated selective signals to party line service. Our companies furnish divided circuit ringing, which requires very simple apparatus, and gives good service.

C. E. Wilson, general manager of the Keystone Telephone Company, Philadelphia, is in the fullest sense of the word a leader in the Independent telephone movement and is an authority on all matters pertaining to telephony. While favoring direct lines, he believes in the use of two-party lines under certain conditions. His reply is brief and to the point:

As a general proposition, direct lines are preferable, but in cities it is necessary to make a lower rate for the small merchant, which justifies the use of party lines from a commercial point of view. We do not believe in placing over two parties on a line. It is impossible to say which class of service has benefited the exchanges most. We receive about the same revenue from party lines as we do from direct lines. I think the question is one that is largely governed by local conditions.

F. J. Dommerque of Chicago, one of the best known engineers in the telephone field and whose views on any subject relative to telephony invariably show deep thought and a familiarity with the subject under discussion, giving them added weight, speaks in this instance from the viewpoint of an operator and believes that the use of party lines is only advantageous when no individual line rates can be secured. His letter follows:

I am connected at the present time with a manufacturing concern, and therefore cannot give you satisfactory information from the viewpoint of the operator. However, I was for many years in the operating field before entering upon manufacturing. As far as operating is concerned, I believe that the use of party lines is only advantageous, when no individual line rates can be obtained. Wherever competition is in the field, the company that can give satisfactory party line service has an advantage over the company without party line service.

The operating company at the present time usually makes a mistake in not putting in the proper party line system. In order to give satisfactory service, the party line system must be provided with individual ringing, so that only the party called for is rung up. Also, the number of parties on one line must be kept limited. As a rule four subscribers on a line can be furnished with satisfactory service in residence districts. In business districts, individual lines should be used in large cities, and two-party lines may be permitted in smaller cities.

Great trouble has been experienced up to the present time from party line systems that ring to ground, and in reality it is a step backward, after eliminating the ground in modern common battery systems, to return again to the ground by adapting these common battery lines to party lines. Therefore, the further requirement of good party line service is the abolishing of the ground at the subscriber's station.

If the mentioned features are embodied in party line systems, i. e., individual ringing, with not more than four subscribers on a line, and no ground at the subscriber's station, party line service is just as good to the resident subscriber as individual line service, because the resident subscriber, as a rule, does not call oftener than two or three times a day, and it would be only accidental that somebody should use the line when he is calling. As far as listening on the line is concerned, the residence subscriber would not know when any other party on the line is talking, unless he chanced to call up at the same time a conversation was going on over the line. He certainly would not find it convenient to stay by his telephone and watch the line in order to overhear another subscriber's conversation, and that would be the only way he could find out whether the line was in use or not.

All I have said above pertains to towns and cities. In the country, we find a great number of telephones—sometimes twelve or more—connected to one line, as otherwise service could not be furnished cheaply enough to farmers. In such cases, of course, party line service is absolutely necessary and the farmers are always willing to sacrifice the possibility of individual ringing, in order to obtain cheap rates.

Sidney Hand Brown, vice-president and general manager of the Pittsburg and Allegheny Telephone Company, is prominent in the telephone field, and his views in the matter will be read with great interest. He favors the party line equally with the single line, and says his company is successfully operating both plans. His letter in full follows:

Your letter requesting my opinion as to the desirability of single line and party line service, asks a very general question. This company is rendering both single and party line unlimited service, as well as single and party line measured service. Our opinion is that low rates are essential to the proper development of business, and, inasmuch as we can render a party line service at a lower rate than single line, we have gone into party line work. As to which is the more profitable—that question can only be answered when the rates for service are known, and the proper rates for one locality and plant will be vastly different for another locality and plant.

In answering your question: "In your judgment, by which service have exchanges been benefited most?" I beg to state that our individual experience in this section, as well as in Baltimore, has been that any one class of service is just as important to us in rounding out our system as any other class.

William L. Moellering, secretary and manager of the Home Telephone Company, Fort Wayne, Indiana, one of the leading Independent operators of the west, while believing that party lines are a necessity and that they have come to stay, does not think them desirable. He says:

Are party lines desirable? No. Are they a necessity, and have they come to stay? Yes. The last will apply as a rule; the exceptions will be found where either the exchange is small or where no competition exists, or where rates are high enough to warrant individual lines only.

The rapid growth of the Independent telephone business is due in part at least to the operation of strictly Independent lines, the departure from this rule being of recent date. The adoption of party lines by the Independent companies has been forced by the steady and rapid increase in the number of subscribers, which, in turn, has often exhausted pole, cable and switchboard capacity and thus compelled here and there a party line.

Opportunities appeared when desirable subscribers could be secured, who could not pay the rate for an individual line and who did not object to a party line. A beginning once made and the process of education begun in this direction will surely lead to its gradual adoption, provided always that proper signalling devices are a part of the system and the number of subscribers on a line is kept at a low limit.

The annoyances due to party lines are many, and the office duties are materially increased thereby. In the constructing of new lines, where individual and party lines run parallel, great care must be observed to avoid confusion. Party line subscribers moving from one part of the city to another add to the perplexities by a change in telephone number, lines are necessarily reported busy very often, and harmony between the different subscribers on a party line is often out of the question.

Party lines add to the telephone company's revenue and to the profits; and although their adoption will be slow, owing to the many objections which can be urged against them (not the least of which is the absence of privacy), it is my firm belief that party lines constitute a permanent and growing feature of the telephone business.

To the telephone company high rates on individual lines are preferable to low rates on party lines, necessity compelling the company to adopt the latter where rates and conditions do not warrant the former. The company must to the best of its ability take care

of the people who apply for service, and failing in this, competition is invited. The subscriber on a party line, paying less than others, has no ground for complaint if his service is not on a par with others.

In answer to your other question as to which kind of service has benefited exchanges the most, my answer would unhesitatingly be, individual line service.

D. A. Reynolds, vice-president and manager of the State Line Telephone Company, New York City, is one of the leading figures in the Independent movement in the Empire state, and speaks from experience. In his opinion the party system has its advantages, but does not embrace the highest ideals of telephony. His views follows:

I am free to express my opinion of party line service as not embracing the highest ideals of telephony. There is, however, advantages in the ues of party line systems which I deem worthy of serious consideration to managers and stockholders of the Independent systems.

It has been the policy of the Bell operating companies to meet the competition of Independent systems by giving free service, or party line service at nominal rates. In every instance this has engendered a competition that only local influence could overcome, and in many instances has hampered the Independent companies or engendered a protracted opposition, which has discouraged stockholders and managers alike, ultimately resulting in reorganizations or a partial abandonment of the original purpose of the company.

I believe the time is ripe for Independent telephone companies to meet this condition by installing party lines with selective calls, coin devices and lock-outs in all residences upon a measured system, ranging from one cent to five cents per message, according to the conditions prevailing in each respective city. While this party line service may not be all that could be desired, it would enable the management to install telephones in every residence, similar to the installation of the messenger call boxes, and the people would pay for the service consumed.

This enormous residential clientele will render the use of the business telephone (installed with one telephone on a line) absolutely imperative and will leave no room for free service or party line service to the Bell company, as property owners will gladly give exclusive contracts to a company adopting so liberal a policy as universal installation. With all the residences connected by party lines, and the business offices by individual lines, there is no excuse for maintaining two systems and the Bell company would be relegated to "innocuous deseutude."

Such a business policy on the part of Independent companies will produce two results: First, the general education of the public to the use of the telephone, which can be largely enhanced by supplying tradesmen with metal tokens in quantities at reduced prices, for operating the machines; and second, the gradual replacing of party line service by individual service at the request of the subscriber, on contract, and at an advance in price of service, when he shall have learned the benefits of the telephone. It will save rebuilding the pole, conduit, and wire plants, a sad experience to many Independent companies, and will render fully 95 per cent of the systems productive from the start. In large cities, it will greatly reduce the cable radius, cheapen the cost of construction proportionately with a corresponding saving in maintenance.

It is a mistake for telephone managers to tell people they must have the best or nothing. A merchant that keeps only silks and broadcloth will have very few customers. On the contrary, give them such facilities as their patronage will warrant, and gradually urge them into the better and higher-priced service.

H. A. Douglas, a successful worker in the Independent telephone field, is of the opinion that party lines are of great advantage commercially to the exchange that has been built with the party line service in view, but not a source of financial benefit to exchanges that have been constructed in the ordinary manner. He embodies his views as follows:

The question as to the relative merits of party lines at low rates and individual lines at higher rates is one of considerable breadth and open to wide discussion, as it is viewed very differently by different exchange managers, whose opinions are governed entirely by the conditions in their particular locality. There is no question but that party lines are of very great advantage commercially to the exchange that has been built with the party line service in view, and where the lines and cables have been distributed in such a manner as to take care of this class of business most economically.

You can readily see how the cost of construction can be reduced because of the reduced number of circuits necessary for handling a given number of subscribers. An exchange so constructed originally will very materially increase the income per circuit, and a considerable reduction in the cost of the central office apparatus would naturally pay a larger interest on the amount invested. On the contrary, exchanges that have been constructed in the ordinary manner, and which, through competition, are obliged to give a cheap party line service, using only a part of the lines and cables installed, allowing a considerable portion of the plant to lie idle, thereby earning nothing, are not in a position to benefit from this class of service, but would receive very considerable greater benefit were they able to use all of their circuits on individual lines at better rates.

The party line service naturally increases to a certain degree the number of telephone users in the exchange, owing to the low rate, but unless the exchange is so constructed that they can be handled economically, they are not of benefit. In speaking of party line service, I do not refer to the special selective apparatus offered by some of the manufacturers, but to the regular two- and four-party lines, where the exchange rings tip and sleeve to ground, one, or one and two rings on a side.

UNDERGROUND CONSTRUCTION.

The Home Telephone Company of San Diego, California, will make extensive improvements and build underground conduits.

The Home Telephone Company of Champaign, Illinois, will make many improvements to its system this spring, laying considerable conduit in the business section.

The Columbus (O.) Citizens' Telephone Company has made application to the board of public service for permission to construct additional underground conduit systems.

The Citizens' Telephone Company of Muncie, Indiana, will pull in 32,000 feet of underground cable and add two additions to their switchboard. The improvements will cost over $26,000.

As a result of a recent disastrous fire at Duluth, Minnesota, a movement has been started to place all the telephone and light wires in the city under ground, for the purpose of facilitating the work of the fire department.

The Standard Telephone Company of Dubuque, Iowa, has asked the city council of Charles City, Iowa, for a franchise to install a copper metallic system in that city, with all wires underground in the business section.

The placing of every telephone, telegraph and electric light wires under ground in conduits and removing all poles from certain prescribed districts of Sioux City, Iowa, is the purport of an ordinance which has been introduced in that city's council.

The Clarion & Northwestern Telephone Company of Clarion, Iowa, is making arrangements to place all the wires in the business section of the city underground, and it is expected that if the experiment proves successful the entire system of wires will be thus placed.

The new telephone system in Portage, Wisconsin, when completed, will be one of the best ever put into a city the size of Portage. The wires in the business portion of the city will be placed underground. The work of putting in the new system will require about two months.

The Columbia Telephone Company of Hudson, New York, has opened its exchange. The equipment is a Stirling central energy board. Trunk lines have been run connecting twenty of the surrounding towns. Sixty thousand feet of underground conduit has been laid and five and a half miles of cable drawn in.

The Interstate Independent Telephone and Telegraph Company, at Peoria, Illinois, is at work on its conduit system, and if the work is continued at the present rate it will not be long before Peoria's hellos will be going by the underground route. Heavy cables will be laid and $350,000 will be invested in the system.

The task of putting the electric and telephone wires underground in the business portion of Seattle, Washington, is progressing rapidly, and during the past few weeks work has been going ahead on the conduits under the supervision of men from the city engineer's office. By the time the new terminal improvements are completed it is intended to have practically all of the overhead wires south of Yesler way underground.

Independent Telephony in the Ozarks.

H. B. McMEAL

HOT SPRINGS, Arkansas, now has one of the most modern telephone exchanges in the country. It was built by W. H. Crumb & Company, Chicago, for the Southern Telephone and Telegraph Company. This world-famed health resort, situated in the foothills of the Ozark Mountains, with its 15,000 residents and 75,000 annual visitors, has been inflicted with an antiquated Bell telephone system for a number of years. Despite the pleas and protests of the citizens no attempt was made by the Southwestern Telegraph and Telephone Company (Bell) to improve the service or install modern equipment, and Hot Springs was noted as having the worst telephone service possible to imagine.

About a year ago, P. C. Burns, president of the American Electric Telephone Company, Chicago, while visiting Hot Springs, saw the demand for an improved telephone service, which, with the future prospects of Hot Springs, immediately appealed to him as an excellent opportunity to establish a telephone exchange. He enlisted the co-operation of Hon. C. D. Greaves, H. H. Hill and others, and organized the Southern Telephone and Telegraph Company, securing a very liberal franchise from the city. Mr. Burns' original intention was to build the plant as an investment for himself, but his many other business enterprises claimed so much of his time that it was impossible for him to carry out this plan. The matter was put by him before the well known telephone construction firm of W. H. Crumb & Company, Chicago, which had recently built telephone plants at Newark, Ohio, Sioux Falls and Yankton, South Dakota, and other places, and Mr. Crumb went to Hot Springs on a trip of inspection last fall. He was so well pleased with the prospects that he immediately decided to purchase from Mr. Burns his interest in the Southern Telephone and Telegraph Company, which company afterward entered into a contract with Mr. Crumb's company, for the construction and complete equipment of the plant, making payment in bonds and stocks, thus giving W. H. Crumb & Company practical ownership and control of the system.

WHERE THE MIRACLE IS PERFORMED—NOTE THE BULLETIN.

Ground was first broken in November, 1903, and an extensive system of underground conduits was installed. This system covers the business section of the city, with extensions out Park, Whittington, Malvern and Ouachita avenues, which are in the residence districts. By the use of this extensive system of underground conduits no poles have been placed along the avenues above mentioned within the limits described. The work of installing the plant progressed very rapidly, and during the month of November the entire conduit system was installed with the least possible inconvenience to the public along the busy thoroughfare of Central avenue and the streets were promptly repaired. The work of laying the conduits was very arduous, in many places the trenches having to be dug in shale or solid rock, but which, when completed, makes a conduit system far superior to any other that could be constructed.

The erection of the pole lines, wires, underground and aerial cables proceeded rapidly after the construction of the conduits and within six months after ground was broken the exchange was giving telephone service.

The first test of telephones was made on April 3, 1904, and was eminently satisfactory, being an occasion for general rejoicing on the part of the citizens, who for years had been at the mercy of the Bell company and had been compelled to put up with a service that was lacking in every particular and had aroused them time and again to the point of mutiny. The first temporary bulletin of subscribers was issued April 11, and on May 1, 750 subscribers had been connected and charges for service had been begun.

The demand for service from the first has been phenomenal and has taxed the resources of the company to the fullest extent to furnish it, nor is there any let up in the demand for the new company's telephones at this time. So popular is the service that it is almost impossible to find in Hot Springs to-day a business house using the Bell telephone exclusively.

"It is a long lane that has no turning," and with the advent of the Southern Telephone and Telegraph Company, the people who had so long been forced to use the miserable Bell service saw their opportunity for sweet revenge, and by the hundred they threw out the Southwestern company's telephones, installing in their places the new and up-to-date instruments of the Southern company. On May 2, 3, 4 and 5 there were by actual count 376 of the Bell telephones ordered out. The greatest number of any one day was on

May 4 when 147 of these antiquated instruments were put out of commission forever. The good work has been going on ever since and a sample of the inroads made by the new company in the Bell subscription list is shown by the illustration of a sample page taken from a directory of the Southwestern concern, which is herewith reproduced. The names crossed out are those of subscribers who discarded the Bell telephone entirely and installed the service of the Southern company. The names with crosses before them are those of persons who retained their Bell telephones and also put in the Independent telephones. Two on the page were out of the city and could not be seen. Of the entire number only one person refused to take the new service and retained the Bell company's instrument. This page is a fair sample of the manner in which subscribers by the hundred have deserted the Bell for the new and better order of things, the Southwestern company at the present time having but a handful of subscribers as compared with the Southern company.

W. H. CRUMB.

As a further indication of the way in which Hot Springs people discarded their Bell telephones three pictures are shown in connection with this article. They are taken from actual photographs (a dozen similar ones were submitted to TELEPHONY) and in each instance will be seen a wagon loaded to the taffrails with Bell instruments that had been discarded by subscribers, to be replaced by the service of the Southern company. No more unique pictures of the sort were ever printed, and they speak louder than any words of the manner in which the Independent movement in Hot Springs relegated the Bell concern to the realm of "has-beens." And what was the case at Hot Springs is being repeated every day in towns all over the United States.

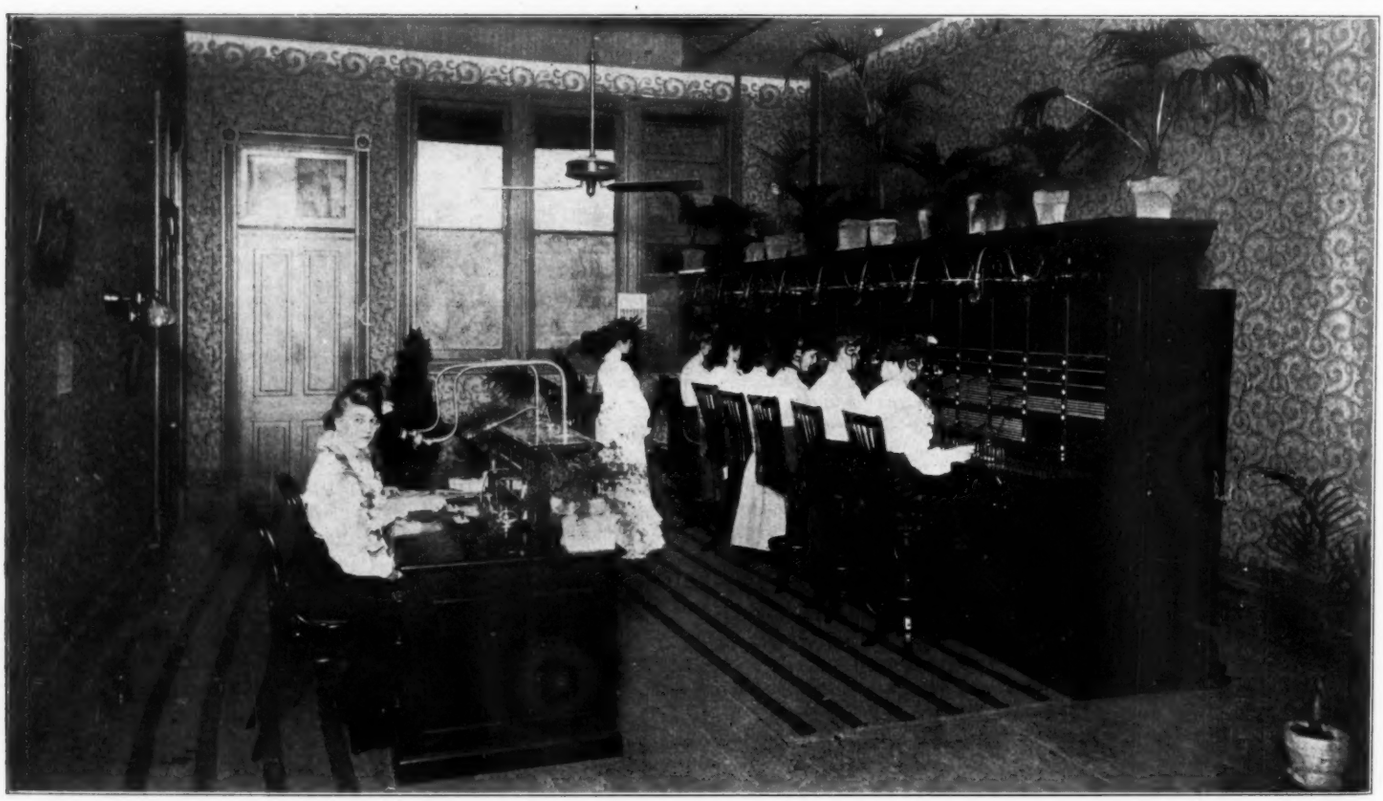
One feature that has been introduced by the Southern company, and which is attracting much attention is the novel way in which the progress of the new enterprise is being advertised. Each day there is displayed on the front of the exchange building an announcement of the number of Southern telephones in use, showing the increase from day to day. An advertisement of the same sort is run daily in the local papers. Thus are the people kept acquainted with the work of the new company and with the strides it is making, which induces many to take the Southern service in place of the Bell. In scores of instances persons who have never before had telephones in their houses have installed the Independent service and are loud in their praise of it.

The plant is adequate in every respect to meet the wants of the Hot Springs public for years to come. The quality of construction is of the very best, being as near the acme of perfection as it is possible to attain at the present time.

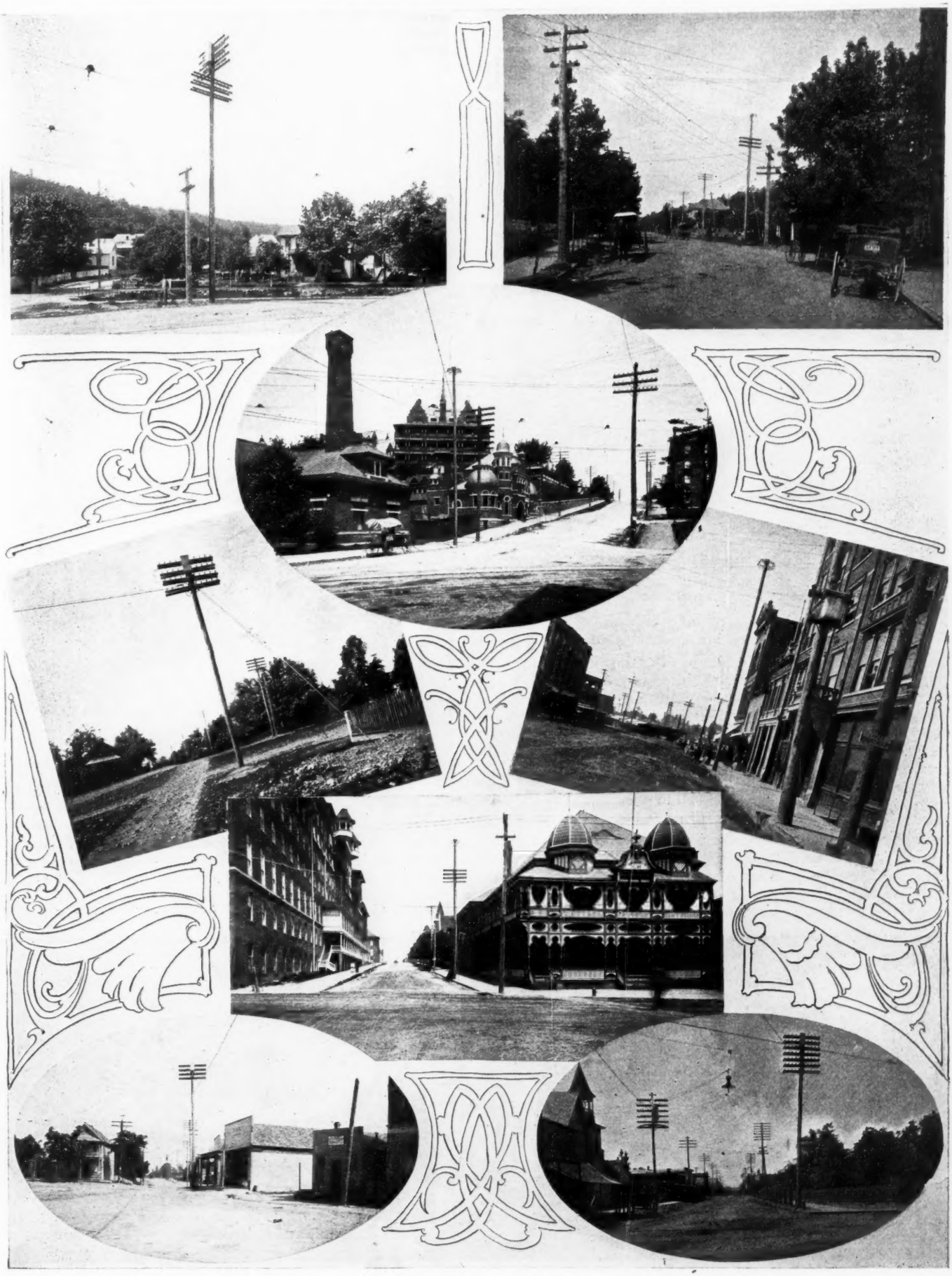
Something of the avidity with which the people of Hot Springs welcomed the new system is shown in the list of 750 subscribers which the company had when it started operations, and in a little over four months (actual construction time) from the day work first began on the plant, the system was in full operation and collections were being made.

The company was very fortunate in securing elegant and commodious quarters in the Central Block, 527-529 Central avenue, that being the telephone center of the city. The exchange quarters are modern in every respect and especially adapted for telephone purposes, the rooms being light and well ventilated and the accommodations ideal.

A sample of the manner in which the business men of the



MAIN SWITCHBOARD OF THE NEW AND POPULAR HOT SPRINGS EXCHANGE.



VIEWS SHOWING THE SUBSTANTIAL AERIAL CONSTRUCTION—SHORT POLES ARE BELL.

city threw their support to the Southern company is shown by the following resolutions passed by a committee of the whole, representing the following organizations, to-wit: The Retail Grocers' Association, seventy-seven members; the Business Men's Mutual Association, thirty-eight members; the Retail Druggists' Association, twenty members; the Retail Liquor Dealers' Association, forty members, at a meeting held March 25, 1904:

Resolved, That our various organizations require but one telephone in their business houses and residences; that the service given us by the Bell telephone company has been unsatisfactory; therefore, be it further

Resolved, That on and after May 1, 1904, our respective organizations agree to discontinue the old telephone and use the new telephone exclusively. We shall use the telephones at the following rates: $2.75 per month for business telephone and $2.00 per month for residences telephone.

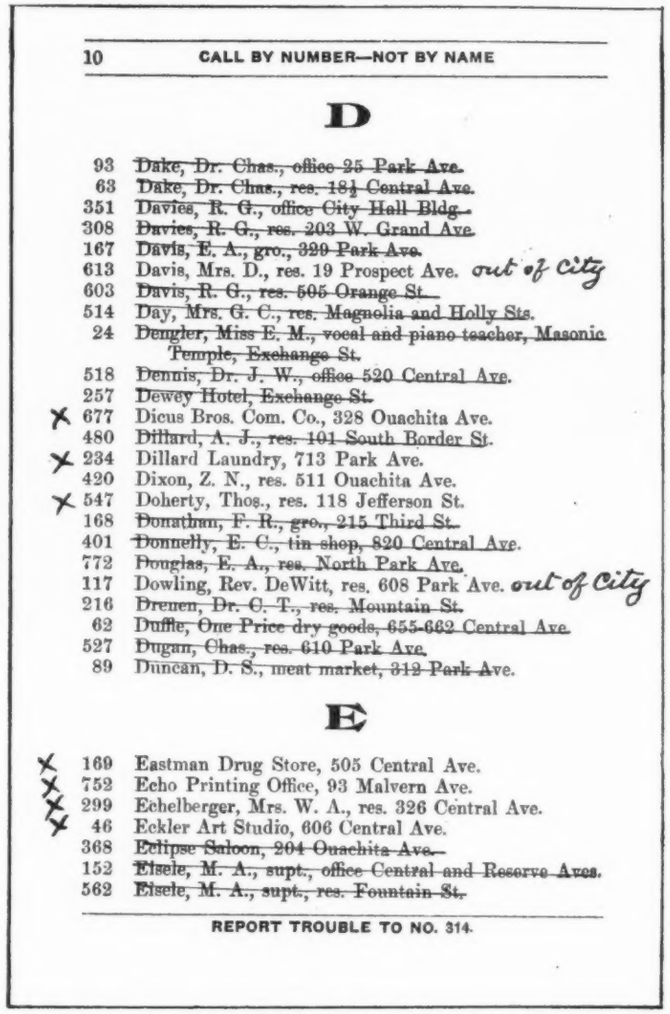
Resolved, That no matter what inducements shall be offered by

A PORTION OF THE CRUMB CONSTRUCTION CREW.

competing companies, we shall confine ourselves to the new telephones, so long as the service is satisfactory, and the above prices maintained.

Resolved, That these resolutions shall not apply to the wholesale dealers belonging to the Retail Grocers' Association.

That the story of the telephone situation in Hot Springs might be unbiased the writer interviewed General Manager J. E. Farnsworth of the Southwestern Telegraph & Telephone Company, who acknowledged the fact that his company had not given Hot Springs good service, nor would he promise any improvement. He had been called to the Springs suddenly from Dallas to advise the local manager what steps to take to stop the wholesale removal of Bell instruments. Mr. Farnsworth frankly acknowledged that the local Bell company was in bad condition; that it had an antiquated switchboard, poor service, a great many Blake transmitters, a rapidly decreasing number of subscribers, and few friends. When asked whether his company would install modern equipment he would not commit himself, but made the evasive reply that the Bell company might do something to improve conditions within a few *years*. He acknowledged that his company had lost most of its best subscribers and said he had requested a great number to replace the Bell telephone and had succeeded in getting one man to order his Bell instrument replaced. The subscriber's



10 CALL BY NUMBER—NOT BY NAME

D

93 ~~Dake, Dr. Chas., office 25 Park Ave.~~
63 ~~Dake, Dr. Chas., res. 18½ Central Ave.~~
351 ~~Davies, R. G., office City Hall Bldg.~~
308 ~~Davies, R. G., res. 203 W. Grand Ave.~~
167 ~~Davis, E. A., gro., 329 Park Ave.~~
613 Davis, Mrs. D., res. 19 Prospect Ave. out of city
603 ~~Davis, R. G., res. 505 Orange St.~~
514 ~~Day, Mrs. G. C., res. Magnolia and Holly Sts.~~
24 ~~Dengler, Miss E. M., vocal and piano teacher, Masonic Temple, Exchange St.~~
518 ~~Dennis, Dr. J. W., office 520 Central Ave.~~
257 ~~Dewey Hotel, Exchange St.~~
X 677 Dicus Bros. Com. Co., 328 Ouachita Ave.
480 ~~Dillard, A. J., res. 101 South Border St.~~
X 234 Dillard Laundry, 713 Park Ave.
420 Dixon, Z. N., res. 511 Ouachita Ave.
X 547 Doherty, Thos., res. 118 Jefferson St.
168 ~~Donathan, F. R., gro., 215 Third St.~~
401 ~~Donnelly, E. C., tin shop, 820 Central Ave.~~
772 ~~Douglas, E. A., res. North Park Ave.~~
117 Dowling, Rev. DeWitt, res. 608 Park Ave. out of City
216 ~~Dreuen, Dr. C. T., res. Mountain St.~~
62 ~~Duffie, One Price dry goods, 655-662 Central Ave.~~
527 ~~Dugan, Chas., res. 610 Park Ave.~~
89 ~~Duncan, D. S., meat market, 312 Park Ave.~~

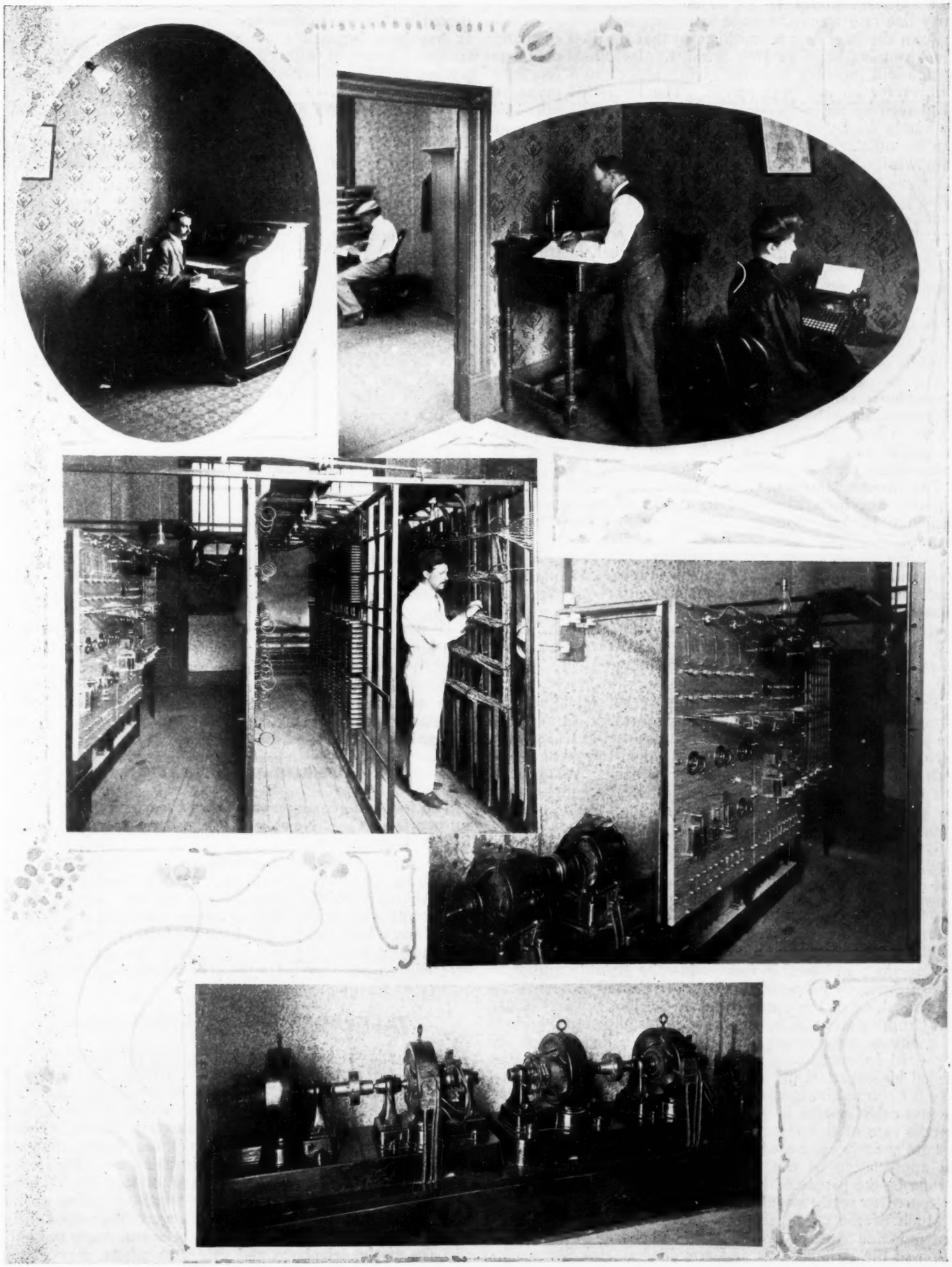
E

X 169 Eastman Drug Store, 505 Central Ave.
X 752 Echo Printing Office, 93 Malvern Ave.
X 299 Echelberger, Mrs. W. A., res. 326 Central Ave.
X 46 Eckler Art Studio, 606 Central Ave.
368 ~~Eclipse Saloon, 204 Ouachita Ave.~~
152 ~~Eisele, M. A., supt., office Central and Reserve Aves.~~
562 ~~Eisele, M. A., supt., res. Fountain St.~~

REPORT TROUBLE TO NO. 314.

reason for doing this was that the Bell company gave him business to the extent of a good many hundred dollars annually and it was to hold this business that he capitulated to the persuasion of the general manager, Mr. Farnsworth, acknowledging this to be so. When asked what efforts would be made by the Bell company to regain its lost prestige, he

SNAP SHOTS SHOWING WHOLESALE REMOVAL OF BELL INSTRUMENTS.



VIEWS OF SOME OF THE OFFICES AND APPARATUS REQUIRED AT THE CENTRAL OFFICE.

said solicitors would be put in the city and that a cheap party line rate would be made to residents.

From the interview it would seem that the Bell company has given up hope in Hot Springs. Its out-of-date exchange will probably continue giving service to a few subscribers for an indefinite period. The local Bell manager when seen by the writer said that without good equipment his hands were tied and that he did not see any chance of heading off the new and popular Independent company. He acknowledged that the opposition system was modern and the service first-class. He did not believe the Bell would make any aggressive fight, but would run along doing the best possible under the circumstances. While Manager Lee denied that 400 telephones had been taken out in ten days, the writer saw great stacks of returned instruments in the Bell storeroom and was reliably informed that the company had rented a vacant house which was nearly filled with returned Bell instruments.

The switchboard of the new system, which was made by the American Electric Telephone Company, Chicago, is an example of skillful workmanship and electrical ingenuity.

The use of the telephones of the new company is general among business men and firms of all classes. The Southern telephones have been installed by both railroads having offices in the city, both express companies, both telegraph companies and both of the banks, one of them using the Independent service exclusively.

The line to Mountain Valley hotel, twelve miles in the country, has been connected to the Southern company's exchange in Hot Springs and the Bell service cut out entirely.

A long distance line will be built to Little Rock, a contract with the Little Rock Telephone Company having been made and the right of way arranged for with the Iron Mountain railroad company. Rural toll lines west of Hot Springs have been contracted for and lines are now building, there being a great demand in the adjacent rural districts for connection with the new exchange of the Southern company.

The well-known construction firm of W. H. Crumb & Company, Chicago, was organized in 1901. W. H. Crumb, the principal factor and active head, was born in Chicago in 1872, and after leaving college engaged in telephone work with the Central Union Telephone Company. While with this company, Mr. Crumb engaged in special constructing work. After leaving the Central Union company he became associated with the Pittsburg & Allegheny Telephone Company as general superintendent, with headquarters in Pittsburg. After the completion of the exchanges in Pittsburg and Allegheny, he resigned and formed the engineering and contracting firm of W. H. Crumb & Company, with offices in Chicago. This company, under Mr. Crumb's direction, has built many exchanges throughout the United States. Particular attention has always been given to high-grade construction, and to this fact is due the stability and success of the many properties built by the Crumb company.

In speaking of the construction of the Hot Springs plant, Mr. Crumb states that he has never in his experience known of a city or town where there was such a demand for an improved Independent telephone service, which has far exceeded his expectations, and that it has already been necessary for him to arrange to increase the capacity of the underground cable system in certain districts, and that he hopes to take care of this large demand before the present facilities are entirely exhausted. Mr. Crumb expressed his grateful appreciation of the generous patronage extended his system by the people of Hot Springs, and says nothing will be spared to retain popular approval.

Much of the credit for the successful operation of the system is due to E. R. Corwin, who had charge of the installation of the switchboards and remained at Hot Springs to organize the operating and maintenance department.

It is a safe prediction that 1,500 subscribers will be connected within the present year to the Independent system. It has been impossible to install instruments as fast as ordered, scores of subscribers sending in orders for telephones without solicitation.

BEES ATTACK A LINEMAN.

Charles Diehl, a telephone lineman in Nebraska, had an experience recently which, although not serious, was of a very painful nature. Something was wrong with the telephone wires in that vicinity and Diehl was sent out to run down the trouble and make the necessary repairs.

Arriving at the point of trouble he found a bad cross of the wires on a tall junction pole, but he learned that in order to properly fix it the large cable box perched at the top of the pole must be opened. Diehl at once climbed to the top and set to work with a will, not mindful of a deep rumbling sound that issued from the box, thinking, perhaps, it was the noise of the wires.

A farmer's hive of bees had taken up their winter's abode in this box, and being thus ruthlessly disturbed they swarmed forth by the hundreds to drive away the intruder. Diehl's astonishment was great, but his astonishment soon gave place to fear and pain, when a number of the bees got down his back, using their weapon of defense in a most unmerciful manner. The more Diehl would strike at his tormentors the more they would sting him. The most courageous man could not withstand such an onslaught long, and Diehl made his retreat as gracefully as possible down the pole.

Neighboring residents soon congregated, offering their assistance in ousting the bees from their stronghold, and plan after plan was tried only to result in failure and more stings.

Diehl's orders were to repair the wires, but no provision had been made for combatting with a swarm of angry bees. Much time had been lost already and Diehl finally decided to brave his enemies and make the repairs, which he did with myriads of the pests hovering around his head. The act elicited round upon round of applause from those upon the ground.

OFFERS A SUGGESTION.

The following communication has been received by TELEPHONY from G. I. Newton of Kenosha, Wisconsin, and is self-explanatory:

"In your April issue I noticed an inquiry signed "New Telephone Company, Ohio," in regard to trouble in locating grounds with the Queen Acme test set. If this party will send his set to Queen & Company and have it arranged for Murray loop test he will have no further trouble. The cost will be about $15 and the value of his set will be increased 100 per cent. I trust this information may be of service to the gentleman."

TELEPHONE DISPELS LONELINESS.

Telephonic connection will do much to ameliorate the loneliness of rural surroundings. Farms are isolated and those who reside on them cannot have that convenient social relation with neighbors which is prevalent in towns and cities. But with the telephone in operation the farmer and his family can have intercourse which will go far towards making their lot a much more enjoyable one. Then telephones can also do valuable service in case of fire, robbery or other startling events by causing people to gather at the scene. There are instances where burglars who plied their calling in the country districts have been run down through the use of the telephone and captured, where they would otherwise have escaped with their plunder.

Cumberland Bell Ousted from Tennessee

LEGAL circles all over the country, as well as telephone men in general, were treated to one of the greatest sensations in years when Chancellor Allison, in the Chancery court at Nashville, Tennessee, May 2, handed down a decision ousting and expelling the Cumberland (Bell) Telephone and Telegraph Company from doing business in Tennessee. Accompanying the decision was an order placing the company in the hands of a receiver. This was later amended by the chancellor, who said that he would decline to appoint a receiver because the company is a Kentucky corporation, and, therefore, if proceeded against outside the state, suit must be brought in the federal court. The grounds for the decision ousting the Cumberland company from the state were alleged conspiracy to stifle competition and alleged discrimination. The company entered an appeal to the next term of the Supreme Court, which vacates the order of expulsion.

The above action grew out of an effort on the part of the state at the instance of the Independent Telephone Company of Columbia, Tennessee, to declare a forfeiture of the charter of the defendant company upon alleged attempts to suppress competition. The Cumberland company has an authorized capital of $20,000,000, and about $12,000,000 is outstanding. It controls the telephone situation in the south by reason of its relations to the Bell company, and has lines radiating into Southern Illinois and Indiana.

The original bill against the telephone company was filed October 9, 1897, by E. H. Hatcher and other citizens of Columbia, Tennessee, the style of the case being "State of Tennessee, on relation of E. H. Hatcher et al., vs. the Cumberland Telephone & Telegraph Company." It was charged among other things that the company by alleged illegal acts at Columbia and other places had forfeited its charter to do business in this state, a contention upheld by Chancellor Allison. One specific charge was that the leasing of the Maury County or Columbia Exchange to Leland Hume, an officer of the company, was an evasion for the purpose of permitting rates to be illegally cut. This contention was sustained by the Supreme court since the filing of the bill in this cause.

The Chancery court further held that the statutes forbid the acquisition by one telephone company of another company or exchange in such a manner as was employed by the defendant, and that the company is a quasi public carrier, and therefore controlled by the law applicable to railroad and telegraph companies, and cannot, therefore, exercise rights and powers denied to railroads.

It was also charged that the company had broken down Independent concerns at Clarksville and Murfeesboro, Tennessee, by low rates and other methods, which it had no right to practice, and that the rates were restored as soon as competition was stifled. This case was heard upon briefs filed with the court at various times, a large number of such papers having been handed in. The decision of Chancellor Allison was wholly unexpected and came as a great surprise, as the case was one that had been hanging fire in the courts for a number of years. Nothing in years has created such a tremendous sensation in telephone circles, as it is believed to sound the death knell of the Bell company in Tennessee and the South.

The officials of the Cumberland Telephone and Telegraph Company decline to make a statement regarding the matter, asserting it is a decision of no import and that business will continue to be transacted as usual. The opinion of Chancellor Allison, which contains a recital of the points in the case, follows:

State of Tennessee ex rel. vs. Cumberland Telephone & Telegraph Company.—Conclusion of Court.—It is sought in this cause to have a decree adjudging that "defendant Telephone Company has forfeited its right any longer to exercise any corporate franchises or power in the State of Tennessee, and that defendant company be ousted from the exercise of corporate power and franchise in said state."

There are several grounds alleged for such decree.

1. That defendant being a foreign corporation had not filed a copy of its charter in the office of the Secretary of State.

It appears that defendant did file a duly certified copy of its charter in the Secretary of State's office on the 29th day of April, 1891, and an additional copy on April 11, 1894. The bill in this case was not filed until Oct. 9, 1897. A decree on this ground is denied.

2. That defendant failed to register an abstract of its charter in each of the counties in the state, in which it is doing business. The acts of the legislature on this subject were passed in 1887, 1891 and 1895, the latter of these superseded the others, and the courts have held that since the passage of the act of 1895, the registration of such abstracts is not required.

The bill, as before stated, was filed Oct. 9, 1897, after the passage of the act, 1895. See 47 S. W. Rep., 24, and S. W. Rep., 76, p. 911.

Before defendant filed its answer it had, however, registered such abstract in the counties where it is doing business.

The relief asked on this ground is denied.

3. That defendant had entered and erected its poles and lines upon the right-of-way of turnpike companies, without permission of the turnpike or condemnation proceedings. The proofs fails to sustain this charge, and relief on this ground is denied.

4. That rates charged by defendant are unreasonable and extortionate There is no competent proof before the court on this question or subject. Relief on this ground is denied.

5. That defendant in violation of law, assumed power and authority to lease its plant, or telephone exchange in the city of Columbia to Leland Hume, who was its assistant general manager, and a director in its company. The proof shows, and it is admitted by the defendant, that it did so lease its exchange at Columbia.

It is also admitted that the Supreme Court, on the application of the state, declared this lease illegal, fraudulent and void and set aside, and that thereupon defendant resumed the control and operation of its exchange at Columbia and has operated it ever since.

This charge in the bill has therefore been adjudicated by the Supreme Court to be true; the charge that defendant has assumed and exercised power and authority not granted in this respect has been conclusively settled.

The defense set up to this charge is that the defendant made this lease under the mistaken belief that it had right and power to enter into such lease.

The lease contract, the circumstances under which it was made and the proof taken together, satisfies the court that the lease to Mr. Hume was not made in good faith by defendant under a mistaken conception of its charter and statutory powers.

It appears from the proof that a competing telephone company or exchange was organized and put into service at Columbia, and that thereafter defendant reduced its monthly rates at Columbia from $1.50, $2.00 and $3.00 per month to 50 cents per month, being 50 cents less per month than the competing company was charging.

It appears also that quite a number of citizens in Brownsville, Tenn., (where defendant was operating an exchange), applied to defendant to have telephone service furnished them at the same rate per month that it was furnishing to citizens of Columbia; that defendant refused, or would not give these Brownsville citizens service at such rate, and that thereupon, or about this time, the defendant leased its exchange at Columbia to Mr. Hume.

The defendant did not lease its entire property to a non-competing corporation engaged in the same business, as it had the right to do, but only leased its exchange at Columbia, where it was dis-

criminating in rates against the citizens of Brownsville and other towns and cities in the state.

All of these facts, established by proof and circumstances and the lease contract, satisfies the court that this lease was made in violation of law, not by mistake—but for the purpose, if possible, of evading liability under the laws of the state for discriminating in its charge for service; the patent purpose and effort of the defendant being to use one of its directors and assistant general manager in the character of lessee of its exchange at Columbia to accomplish this end and at the same time and through the same instrument continue its operations, and carry out its purpose, to break down its competitor in Columbia and thereby suppress competition in that city, as it had heretofore suppressed and driven out competition, by similar methods, in Clarksville and Murfreesboro, Tenn.

Part of the consideration of the deal at Murfreesboro, when defendant bought the competing telephone or exchange at that place, was that Dr. J. E. Thompson, who had organized the competing telephone in that city, would not thereafter organize and operate any telephone in the territory occupied by defendant.

A similar agreement was made with a competing company at Clarksville, when defendant bought it out.

In Clarksville and Murfreesboro, as the proofs show, defendant reduced its rates to 50 cents per month for service in each of these cities while the other telephones were in service there, and that this was 50 cents less per month than the others were charging for like service, but that as soon as the defendant had succeeded in breaking down and buying up the other companies by such methods it put its rates up again to $1.50 and more per month, and then refused to carry out some contracts it had previously made to furnish service at 50 cents per month.

In connection with, and as part of, this latter charge in the bill, it is alleged that the defendant has thus suppressed competition in the cities of Clarksville and Murfreesboro, and is engaged in an effort to suppress competition at and in Columbia by the employment of unlawful and forbidden methods.

This course in the business methods of defendant in suppressing competition by breaking down and buying out competitors is sought to be justified by the defendant under sections 2043, 2046 and 2202 of Shannon's Code. Section 2043 empowers corporations in Tennessee to lease their property and franchises in Tennessee to any other corporation engaged in the same business in this or any other state, but section 2046 says that section 2043 shall not apply to competing railroads; section 2202 authorizes telephone companies to consolidate.

As to section 2202, it is sufficient to say that there was no consolidation of the two telephone exchanges, or companies, at Clarksville and Murfreesboro with defendant; the defendant simply broke down the business and business prospects of these two companies, or exchanges, and then bought their tangible property at prices virtually fixed by itself, and then went on operating its own exchanges, and put rates for service up to prices formerly charged.

It is insisted by defendant that section 2043 gives it power to acquire or buy out competing "exchanges" or telephone companies, that it had the right under this section to acquire the other two companies at Murfreesboro and Clarksville in the manner it did, for the reason that section 2046 only forbids a railroad from leasing and taking over a competing line; that telephone companies not being named along the railroads as forbidden to lease a competing exchange or telephone, that telephone companies are, therefore exempt or excluded from the provision and policy of this section, and further that the methods used and employed by defendant at Clarksville and Murfreesboro, which enabled it to buy out and to take over the two competing companies or exchanges in these two cities, was nothing more than the consolidation contemplated and allowed under section 2202.

The court holds that section 2043 only authorizes one corporation to lease and not to buy outright, the property and franchises of another corporation engaged in similar or the "same business," and that under this section such corporation, if it be a telephone company, can neither buy nor lease a competing exchange or company.

The court further holds that section 2202 did not authorize the defendant to acquire the property of the two other companies at Clarksville and Murfreesboro in the manner and by the methods employed. A corporation takes and exercises powers by specific grant and never by implication.

The court further holds that the provisions, principles and policy of the whole of section 2046 applies to telephone companies, and therefore forbids the acquisition by one telephone company of another such competing company or exchange in the manner and by the methods employed by defendant to acquire the one at Clarksville and the other at Murfreesboro with their franchises and property.

A telephone company must occupy and sustain the same relation to the state, the citizens thereof, and to commerce and business generally, in the exercise of its franchise rights and powers and the discharge of its duties, that railroads and telegraph companies do.

If this be true, they are quasi-public common carriers (of messages) and therefore amenable, or subject to, and controlled by, the whole statutory law of the state applicable to railroad and telegraph companies, and cannot, therefore, claim and exercise powers and rights which are denied under the statutes to railroads.

The court holds that defendant has assumed to exercise powers and authority not conferred upon it by the laws of the State of Tennessee, and has forfeited its right to exercise any corporate franchise or power in the State of Tennessee, and that defendant be ousted from the further exercise of any such power or franchise in the state, and that its business be closed and wound up.

For satisfactory reasons the court declines to appoint a receiver to take charge and settle up the business of the defendant.

The action of the clerk and master on the several exceptions taken by relators to certain evidence in certain depositions is sustained except as to exceptions Nos. 5 and 7, which are sustained by the court, and also as to all exceptions to evidence inquiring into the motives of the relators, such exceptions are sustained on the ground that the motive of the relators is immaterial.

TROUBLES OF TELEPHONE MEN.

That telephone men have troubles of their own is evidenced by the following instance which a manager of a rural telephone line relates:

"A peculiar incident occurred on one of our farm lines last winter," he said. "The line would work clear as a bell part of the time and would then go dead for an hour or two. We had a lineman out on the job with the mercury hovering around twenty below zero. The man would no more than work over several miles of the line than it would clear up, and of course the source of the trouble could not be found. It would soon go dead again and the subscribers on the line called at the office and registered the most vigorous kicks as to its condition. The lineman chased this will-o'-the-wisp several days, when he finally stumbled upon the cause, and what do you suppose the trouble was? Nothing but a pair of spectacles laid upon the top of the telephone, where an old lady would put them safely away from the children's reach. She would use them at odd times during the day, and, of course, as soon as she would lay them away again the line was in trouble."

He explains this as follows: The spectacles had metal bows, and when laid on top of the telephone would make a connection between the line-post and ground wire post, thus short-circuiting or crossing the line. All of the electricity thrown on the line would go to this point and escape, instead of going through the bells and ringing them.

Another case of the farmer's inquisitive turn of mind with regard to the telephone happened in Indiana. The farmer was trying to see what was inside of the transmitter. He took the screws out, and, of course, the spring forced the diaphragm off, and the granular carbon was spilled over the floor. The farmer, not to be fooled this way, refilled the transmitter with gun powder (gun powder looks exactly like carbon) and "winked the other eye," thinking that he ought to have been a telephone man instead of a farmer, connected the transmitter up again and called his neighbor to see how it worked. As soon as he lifted the receiver off the hook the electric current flowed through the transmitter, igniting the powder, which blew the front off the transmitter and very nearly put out the farmer's eyes.

The telephone companies have lots of cases where telephones have been taken apart and put back again, of course generally wrong, causing a long drive on the part of the lineman to repair the same and a vigorous denial on the part of the subscriber that the telephone has been touched.

Nothing should be laid on top of the telephone, not even papers, as a discharge of lightning is apt to set inflammable matter afire, while other things either break the wires or grounds the line.

A girl refused to marry a telephone repairer three times in the past six months, giving as a reason that he was too much of a wanderer, roaming from pole to pole, and from climb to climb, and that if he did come home he'd be in-sulate that the neighbors would be sure to talk.—*Ex.*

Heard on the Party Line

LONG-DISTANCE REVENGE.

The young man, with a malicious gleam in his eye after the quarrel, had dropped his fee in the slot of the public telephone, obtained the desired connection, and inquired in a falsetto voice:

"Hello! Is that Miss Snubbem?"

"Yes," said the voice at the other end of the wire. "Who is this?"

"Beg pardon. I can't quite understand you."

"This is Miss Snubbem. What do you——"

"Beg pardon. Speak a little more plainly, please. Is this Miss Snubbem?"

"It is. Who are——"

"Beg pardon again. I can't quite catch your answer."

"I say this is Miss Snubbem. Who——"

"I am very sorry, but I can never understand anybody who is eating candy and using a telephone. You are eating candy, are you not?"

"Y-yes."

"Please take it out of your mouth. Have you taken it out?"

"Yes."

"Well, that's all."

Whereat he hung the receiver on the hook again and went out with a satisfied grin on his face.

TELEPHONIC DIAGNOSIS LATEST THING IN KANSAS.

"Hello! Is this the doctor?
Well, my baby's got a cough.
You cannot call to see her?
You'd put other patients off?
Well, then, I'll hold the darling—
My arms would never tire—
While you listen to her whooping
As she coughs into the wire.
It's not the croup, you tell me?
Bless the telephone and you!
And now, then, Mr. Druggist,
For the privilege what is due?"

Quite likely no modern, up-to-date contrivance of man's genius has performed just the important part in medical science that daily is being performed by the telephone system of Westmoreland, a pretty little town near Topeka, Kansas.

As an aid to the ouly physician in the place it is invaluable. For it is assisting Dr. Willis in the diagnosis of suspected croup cases by long-distance examination—not by sight, but by sound.

Several days ago a croup epidemic broke out in Westmoreland, and soon Dr. Willis was overrun with mothers with babies in arms, and, naturally, he could not give all an immediate and personal inquiry.

So, one night, after an unusually crowded day of examinings, he dreamed a way out of his jammed dilemma. Quite so feasible did the idea dreamily strike the doctor that it awoke him, and then another idea struck his waking self.

Dashing to his telephone, Dr. Willis called up a woman whose baby was threatened with croup. When the response came Dr. Willis asked for the little one.

"She's sleepless with her cough, doctor," replied the mother, herself sleepless with her nursing.

"Wrap baby up well, then," said Dr. Willis, "and fetch her to the telephone. Never mind any whys or hows, but do as I tell you, madam!"

Madam evidently did so as ordered, for soon the doctor was screwing the receiver of his telephone deep into his left ear.

"Draw baby a little closer," he directed.

"Ah, that's it, that's it," he cried, and then listened again.

"It's all right, Mrs. ———, your baby has no croup, just a bit of a cold. Give her the tonic I suggested to-day."

Thus Dr. Willis discovered how to diagnose coughs, croups and colds by telephone, and though he seldom gets any sleep now, he is the most blessed man in all that section of Kansas.

WHY THEY CHANGED HIRED GIRLS.

John D. McLeod, general manager of the Wisconsin Telephone Company, is mourning the loss of a gallon and a half of the finest Vermont maple syrup, and his wife and the rest of the household are trying to devise a way in which the aforesaid syrup can be soaked out of the hardwood floors of the kitchen and dining room of the McLeod residence, in Milwaukee, so that the sweetness will not be a standing invitation to unwelcome visitors in fly time. Incidentally Mr. McLeod declares he has decided not to put floor varnish in a syrup can again.

"My wife had decided that the floors needed revarnishing," said Mr. McLeod, in telling the story, "and the girl declared that she knew how to do it herself. She went into the cellar and presently appeared with the varnish can, presumably. Soon she was industriously painting the floor with it. It did not seem to go just right, but she blamed it onto the weather. Before she had finished, however, she found that the 'varnish' was granulating.

" 'There is something wrong with this varnish,' she told my wife. 'It is all crumbling up. I don't know what to do with it.'

"Mrs. McLeod hurried to the room, and one whiff of the fragrance of the can told the story. The worst of it was that I sent to Montpelier, Vermont, for the syrup, and it was the finest made."

PLEASE SAY "HELLO."

At Kansas City, Missouri, where 3,000 druggists and doctors have thrown out Bell telephones and retained those of the Home Company, the officials of the former concern are sort of sad and dazed and wondering what will happen next. The *World* of that city prints the following clever bit of verse as bearing upon the situation:

(As being sung with poor success by that eminent Jackson county baritone, Mr. Alonzo Burt, to the subscribers of the Bell telephone monopoly.)

AIR—"AU REVOIR."

Please say "hello," and not "goodby,"
For parting brings a bitter sigh;
I know I've done you wrong for years,
Caused manly oaths and women's tears,
But don't blame me, a humble tool,
And make of me your April fool.
O, stay with us and do not roam,
Attracted by that "Home, Sweet Home."
I promised you—list to my vow,
I'll ne'er tell you "They're talking now."
Don't forsake me and Frank Rozzelle
Or business will all go to smash.
That's why I plead with wailing cry,
Please say "Hello" and not "Goodby."

The Boone County (Iowa) Telephone Company has increased its capital stock to $150,000.

Telephony.

AN ILLUSTRATED MONTHLY TELEPHONE JOURNAL

TRUTHFUL ❧ FEARLESS ❧ INDEPENDENT

Edited by
H. B. McMEAL and H. E. BABCOCK.

Published by
The TELEPHONY PUBLISHING CO.
301-336 MANHATTAN BUILDING, CHICAGO, ILL.
Telephone: Harrison 2951.

H. B. McMEAL, - - - - - - - - - President
ED J. MOCK, - - - - - - - Secretary and Treasurer
ELMER E. SMITH, - - - - - - Advertising Manager

European Office: 36 Maiden Lane, Covent Garden, London, W. C.

TERMS OF SUBSCRIPTION:

United States, Canada or Mexico - - - - Per Year, $1.00
Foreign Countries, within the Postal Union - " " 2.00
Single Copy - - - - - - - - - - - - - 10 Cents

In requesting change of address, always give the name of the post office to which your magazine is sent. Your name cannot be found on our books unless this is done.

TELEPHONY is not returnable from the newsdealer. If you desire to purchase the paper from a dealer it will be to your advantage to notify him that you will want it, in order to insure his having a copy for you. If you wish to receive the paper regularly, please send in your subscription so that we can mail it to you direct.

Change in advertisements intended for a particular issue should reach the Chicago office of TELEPHONY by the 20th of the month preceding publication. New advertisements can be received up to the 25th of the month.

ENTERED AT THE CHICAGO POST OFFICE AS SECOND CLASS MAIL MATTER

COPYRIGHTED 1904—ALL RIGHTS RESERVED.

CHICAGO, JUNE, 1904.

Table of Contents.

Model Ohio System—Bruce and Fowler 411-418
The Fascinating "Hello Girl" 418
Telephone Line Protective Apparatus—S. G. McMeen 419-421
Digest of Telephone Patents—E. E. Clement.....422-429
Questions and Answers—J. C. Kelsey.....430-431
Automatic at Grand Rapids—C. E. Tarte.....432-436
Indiana State Convention 436
Study of the Telephone Artist 437
Decisions Affecting Telephony—G. W. Hand.....438-439
Individual and Party Lines Compared 440-442
Telephony in the Ozark Mountains—H. B. McMeal.....443-448
Bell Ousted from Tennessee 449-450
Heard on the Party Line 451
EDITORIAL—
The Party Line Controversy 452-453
Telephone Clerk as a Business Winner 453
Decision Against Cumberland Bell 453-454
Independent Telephone Securities 454-456
Speaks for Itself 456
The Two Telephone Bugbears 456
The Use of Telephones 456-457
Telephone at the World's Fair 457
Independent Directory Plan 458
More of the Same 458
Song of the Telephone Microbe 458
Digest of Telephone Patents 459-461
An All-Cable Telephone Plant—L. W. Stanton.....462-464
Telephone in Foreign Countries 465-467
Personal 468-469
St. Louis and Its Telephone Interests.....470-475
MANUFACTURERS' DEPARTMENT—
Williams Telephone and Supply Company 476-477
Sterling Electric Company's 1904 Equipment 477-478
Wood Fibre Conduit 479-480
Automatic Switchless Intercommunicating Telephone 481
Trade Notes 482-486
Joint Exhibit at World's Fair 486-487
Andrae Underground Distribution Box 487
Telephone Tales Tersely Told 488-491
In the Rural Line Districts 492
Incorporations of the Month 493-494
Annual Meetings 494

THE PARTY LINE CONTROVERSY.

Perhaps not in all the long list of telephone problems is there one that has been more generally argued pro and con than that bearing upon the relative merits of individual, or direct, line telephone service and party line service. It is without doubt the most vexatious question that confronts telephone men to-day, and is apparently no nearer a satisfactory general solution than it was the first day it was broached, which dates back to the birth of the party line movement. Since then, year after year, the party and single line systems have continued to be a debatable proposition, each plan of operation, singly and together, having its champions by the score. Let it be understood in the beginning that in no manner are the merits of the individual line brought into question. Its success has been emphatically demonstrated, once and for all. The principal point of debate is the value of the party line as compared with the direct line—in other words, it is simply the party line that is under discussion.

Examples without number have been given of successes achieved in the operation of the different plans, to bolster up argument, and to "clinch the case," as it were. On the other hand, those opposing party lines have cited numerous instances of alleged failures in its workings, to demonstrate that the system is faulty and that sooner or later it must and will be abandoned and the entire telephone world placed on a direct line bases. One peculiar feature of this country-wide controversy is that owners and managers of telephone systems, built where the conditions are practically the same, successfully operate these same different systems, each claiming that his plan is the logical and sane one and condemning the other in the event the party line is not used.

It is this wide divergence of opinion that has so puzzled the scores and hundreds of telephone men just embarking in the business, and has been a thorn in the flesh of the embryonic telephonist, who has looked to experienced telephone men for a solution of the problem, and has found it not.

It was because of this existing state of affairs, and with the hope of letting new light in on the subject that TELEPHONY some weeks ago indited communications to a score or more of leading telephone men throughout the country, asking them in substance the following questions:

1. What are your views regarding the relative merits of individual, or direct, line service with party line service?
2. Are low rates on party lines preferable to higher rates with individual lines; and which plan, in your opinion, is the most desirable to the telephone company and to the subscriber?
3. In your judgment by which service have exchanges been benefitted the most?

A dozen or more replies were received—in some instances the writers discussing the proposition in its different phases at length—and these are printed in another part of this publication, in the form of a symposium, under the general caption, "Individual and Party Lines Compared." Excellent and seemingly, in some instances, incontrovertible arguments are brought to bear both for and against the party line; and yet after all has been said, the problem, insofar as a satisfactory settlement, one way or the other, is concerned, remains practically just where it has been from the first, the writers differing in their opinions as widely as they are scattered over the union.

In not a few cases, the writers assert, they use both direct and party lines in the operation of their systems, and find the party line a good thing from the viewpoint of both subscriber and company. Several who oppose the party line for cities favor it for use in the country. One manager says he believes the party line is a necessity and has come to stay, but he frankly admits it is not desirable in any way. Another emphatically asserts—and that without qualifying phrase of any sort—that party lines are altogether bad and

unprofitable, and that no telephone company which has the best interests of itself and its subscribers at heart, will operate them. Still another writer declares that the party line is the most profitable in rural communities, where the cost of the line wire bears a large proportion of the general expense. Some companies, it is stated in one communication, draw the line on furnishing party lines to business houses, but do not object to residences, while another asserts that the use of the party line is only advantageous when no individual line rates can be secured. One prominent telephone man gets around the subject very neatly by saying that the party line has its advantages, but does not embrace the highest ideals of telephony.

The general plaint among these writers, and among telephone men in general, appears to be that the use of party lines is governed altogether by local conditions, and yet these same telephone men know that identical local conditions in towns or cities of the same class do not produce the same opinions or results. The cry of "local conditions" is an old one, and the average telephone man, when the problem grows too deep for him, is all too prone to fall back on the "local conditions" argument.

While TELEPHONY does not dispute the arguments and theories, either pro or con, regarding the merits or demerits of the party line, it cannot but believe that this wide range of opinion relative to its use is not conducive to the best results in the field of telephony. There must be some common ground, some neutral field, where all interested, of whatsoever opinion, may meet and come to some definite understanding. It is a problem, we believe, which should be more thoroughly discussed at telephone conventions. Its earnest consideration cannot but be profitable and bear good fruit in the Independent telephone cause.

TELEPHONY would be glad to hear from telephone managers and all interested in this vital question, and will take pleasure in publishing the views of any and all who may desire to go on record in the controversy, hoping thereby to create a discussion which may, in a measure, at least, clear away the clouds of uncertainty that now envelop the party line problem.

The telephone quickens the pace of progress.

THE TELEPHONE CLERK AS A BUSINESS WINNER.

It is evident that the big industrial concerns throughout the country are beginning to more fully realize the importance and value of the telephone clerk in the building up of their clientele and as a business getter. Wherever the system is being intelligently and persistently used and followed, an enlarged business and increased profits are invariably reported, and the plan pursued with renewed energy and enthusiasm. An instance may be cited in proof of the foregoing statements. The annual report of one of Pittsburg's big establishments showed such a marked gain in the total transactions of the year that the general manager was approached on the subject and asked to make known the secret of the phenomenal growth of business being experienced by his house. He said:

A large proportion of this marked increase in the great volume of local business we did last year, over that of any preceding year, can be directly traced to the intelligent and conscientious watchfulness of our telephone clerks. Now don't misunderstand me and give all the credit to the telephone. It's the clerk, not the telephone, who makes or mars your trade. To place an incompetent person in charge of your telephone is to drive some customers away and to convert others into bitter enemies. One will be impudent, the next indifferent, the next slovenly, causing no end of blunders.

Eighteen months ago we placed a young, active and ambitious clerk in charge of our telephone business. This clerk was familiar with our stock and methods, and had a general knowledge of our customers' needs. Result: That clerk called on every one of our customers by telephone within the first thirty days and in sixty days the increase in telephone orders was simply marvelous.

And what is true in the case of the Pittsburg concern may be made a like reality in every business house in the country where this plan is systematically followed out. It takes but a moment for the shrewd business manager to see its good points, and he who will not avail himself of the golden opportunity to build up his business is either behind the times or seeks not the main chance to attain the maximum of success. The telephone and the telephone clerk, as applied to modern business methods, are absolutely indispensable, and represent enterprise, energy and economy, which are bound to bring success.

The telephone makes moments do the work of hours.

CHANCELLOR ALLISON'S DECISION AGAINST THE CUMBERLAND BELL.

Whatever is the ultimate legal outcome of Chancellor Allison's judicial action in ousting and expelling the Cumberland Telephone and Telegraph Company from Tennessee, the moral effect of his decision is far-reaching, and proves what TELEPHONY has all along maintained—that the Bell company will stop at nothing to accomplish its ends in crushing competition; that it is as utterly devoid of conscience or soul in its dealings as an octupus, and that it fears neither God, man or the devil. Neither respect for the law nor a spirit of fairness and decency ever animates the Bell corporation proper or any of its affiliations, when it comes to the matter of dealing with Independent companies. So deep is its hatred for anything bearing the Independent stamp that in order to overcome opposition and accomplish its purpose it will resort to every imaginable trick and subterfuge, no matter how despicable, to achieve its end, even to the extent of overriding the law, which it has proven, by its actions in numberless instances, that it holds in supreme contempt.

Occasionally, however, the Bell people are made to understand that "there is a God in Israel," when they are caught red-handed in some one of their numerous characteristic plots to stifle competition at any cost, and are shown up in their true light and brought under the ban of the law they have so often trampled upon. This was the case in Tennessee, where the Cumberland Bell concern, a Kentucky corporation doing business in that state, resorted to unfair and unlawful methods to kill off competition in several towns, succeeding in its unworthy purpose, but, in so doing, bringing disaster upon itself, because of its repeated brazen violations of the statutes, which finally was its undoing.

The beginning of the Bell's trouble in Tennessee dates back to 1897, when E. H. Hatcher, representing a large number of citizens of Columbia, Tennessee, filed a bill to oust the Cumberland from doing business in the state, alleging many grounds for such action. The bill recited that at Columbia the company had evaded the law by leasing that station to Leland Hume, one of the officers of the company, and had cut rates below those of the Independent company and far below their own former rates. Columbia citizens were joined by citizens of Murfreesboro and Clarksville, whose complaints were practically the same as those of Columbia. In each instance the Independent company was first broken down by the Cumberland by the exercise of the most questionable methods, combined with the cutting of rates to a point where no company other than the Bell could do business and live. Then the Cumberland would buy up the wrecked telephone company for a song, and immediately raise its rates.

In Tennessee, it seems, doing business on this plan is illegal, and it was not long before the Bell offshoot found itself in hot water. It bitterly fought the contentions of

the prosecution, and exhausted every means within its power to have the suit against it withdrawn. But it utterly and ignominiously failed in this attempt, and after being brought face to face with the law it so often contemptuously scorned, it at last came to grief, because of practices of a monopolistic character, not authorized by the charter under which it was operating in Tennessee, and in the end a receiver may be appointed to wind up its affairs in that state.

In his decision Chancellor Allison denied some of the contentions of the complainants, but sustained their attack on the company on other grounds equally as effective. The chancellor in his decree "adjudged that defendant telephone company had forfeited its right to any longer license any corporate franchise or power in the State of Tennessee, and that defendant company be ousted from the license of corporate power and franchise in said state" for the following alleged grounds:

First, that the defendant was a foreign corporation and had not filed a copy of its charter with the secretary of state; second, that defendant had failed to register an abstract of its charter in each of the counties in which it does business; third, that defendant had run its lines upon rights-of-way of turnpike companies without permission or condemnation proceedings; and, fourth, that rates charged by defendant were unreasonable and exorbitant; fifth, that defendant in violation of law, assumed power and authority to lease its plant, or telephone exchange, in the city of Columbia to its assistant general manager. The proof shows and it is admitted by the defendant, that it did so lease its exchange at Columbia. It is also admitted that the Supreme court on the application of the state, declared this lease illegal, fraudulent and void and set it aside, and that thereupon defendant resumed the control and operation of its exchange at Columbia and has operated it ever since.

The Cumberland Company claims there is nothing in the suit, and that it was merely an effort on the part of Columbia telephone company to make the Cumberland buy it out. The chancellor held, however, that the alleged motives of the relators were immaterial if the facts complained of had been committed.

An appeal to the Tennessee Supreme court was taken by the Cumberland, thus staying the order of expulsion. This was to be expected for two reasons—first, on general principles, and, second, from the fact that the Bell company has proven time and again that it will stop at absolutely nothing: that it will move heaven and earth to defeat the law where it interferes with the carrying out of its pet plans. Cumberland officials put up a bold front and appear to attach no importance to the decision of Chancellor Allison, but they know and the public at large knows that their insolent, nonchalant attitude is assumed for a purpose, and that their loud-voiced bravado is of the whistling-in-the-graveyard sort.

President James E. Caldwell of the Cumberland company has given out a statement on Chancellor Allison's decision, in which he sneers, after the accepted Bell style, at the opinion of the Nashville jurist and predicts that the Supreme court will see to it that the poor, struggling, downtrodden Bell concern is rehabilitated in the eyes of the law and the people, and again placed in a position where it may continue its work of "benevolent assimilation" among the Independents of Tennessee. Mr. Caldwell says:

"The sensational reports sent out concerning the decision of a local judge of an inferior court, in the Cumberland Telephone and Telegraph Company case are unwarranted. Our attorneys have appealed the case to the Supreme court, where it will be tried, de novo, and they have not the slightest doubt of the incorrectness of the decision, which, even if affirmed on appeal, could have but slight effect anyway. The appeal vacates the decision of the inferior court and there is now no decree of any kind against the company. It will be borne in mind that this is a fight between rivals and is not a suit involving money claims."

Knowing the tactics of the Bell company and taking the case at its face value, TELEPHONY believes that Chancellor Allison did just the right thing and conserved the ends of justice in his now famous decision. We further hope and believe, with every other well wisher in the Independent cause, that the Supreme court of Tennesee will sustain the verdict of the lower court in this case. Rough as this is and will be upon the company and its stockholders, and also upon its customers, there can be no other course pursued where a corporation conspires to build itself up on the ruin of its competitors.

Seek Independent telephone securities for safe investment.

INDEPENDENT TELEPHONE SECURITIES.

The important position occupied by Independent telephone companies in the commercial world, the growing value of and increased demand for their securities, and the marvelous developments which have resulted since these companies first began to furnish service, late in 1894, are, to a large extent, known to almost every investor, but to cover the scope of inquiries that will occur to prospective investors the following facts are herewith presented:

The excellent service, both local and long distance, that is being furnished by Independent telephone companies, has attracted the attention everywhere of capitalists and men of affairs. Bankers and financiers, realizing the exceptional opportunity for the profitable employment of capital in the Independent telephone field, have entered actively into the financing of these enterprises, resulting in placing before the investing public the bonds of these companies, which securities have proven remarkable for their stability.

The construction of a telephone plant requires the investment of a smaller capital, in proportion to the population to be served, than does any other quasi-public corporation. The use of the telephone imposes the lowest cost per capita on the people of any of the public utilities. Thus, during the period of depression a few years ago, when new construction had entirely ceased in almost every industry, there was a steady growth in telephone construction, and a constant increase in the number of telephones used.

The modern methods of installing a telephone plant, practically placing the entire wire system underground, enables the company to operate and maintain its plant at an extremely low cost, and when to this is added the excellence of construction and equipment supplied, together with the popularity of the Independent character of the enterprise, these systems at once show exceedingly profitable returns on the money invested in their construction.

In the earlier years of the Independent telephone movement, poor construction and inferior instruments handicapped, to a large extent, the progress of these enterprises, but with the expiration of basic patents, enabling Independent manufacturers to provide instruments and equipment of the highest order, these companies were, and are now, able to supply equipment and instruments of as perfect a type as is reasonable to expect human ingenuity to devise.

There are in the United States 212 cities having more than 20,000 inhabitants each; of these, 162 already have Independent telephone exchanges, franchises have been granted in eleven additional cities and applications are pending for franchises in twelve more; and there are very few towns of any importance in which the Independent telephone exchanges are not in operation or under construction. Each year finds a greater number of Independent telephones being installed than in the preceding year, and the amount of telephone construction under way and completed during the year 1903 was nearly double that of any previous year.

In this respect the record of Independent telephone development is unequaled by that of any other industry. The large amount expended within the past eight years in the construction of Independent telephone plants, established over the entire United States, is a remarkable showing, and cannot but be convincing as to the stability of Independent telephone securities. There are at present in operation in the United States over 7,000 Independent telephone exchanges, which operate in round numbers 3,000,000 telephones in exchange service, representing an investment of over $300,000,000.

An important element of the security afforded by bonds of these companies is the connection with other telephone exchanges for long distance service. The highest class of long distance service is now being furnished by Independent telephone companies in Missouri, Ohio, Indiana, Michigan, West Virginia, New York, Pennsylvania, Kentucky, New Jersey, Maryland, Illinois, Iowa, Minnesota, Nebraska and Texas; also in Oklahoma and Indian Territory. There is an Independent telephone exchange in nearly every city and town of these states, long distance service also being furnished them.

As an indication of the great opportunity for increase in the telephone business is cited the fact that less than four per cent of the population of this country are using telephones, while in some sections it is being used by from twelve to fifteen per cent of the population. The education of the public to the utilization of the telephone as a convenience has developed its use to an absolute necessity.

When one takes into consideration the valuable rights and franchises that have been obtained, the high type and standard of construction and equipment resulting in low operating expenses, in addition to the large possible and probable increase in the use of the telephone, it is readily seen that in the bonds of these Independent companies is found a very attractive and desirable investment.

It has come to be an accepted fact that there is no class of securities that is so little affected by the business conditions of the country as that of the companies conveying messages, oral or written, namely, telephone and telegraph companies. This is an important element in considering the value of telephone securities. Almost every other kind of securities are affected by the so-called hard times, and especially is the earning power of industrials and railroads cut down by depressed business conditions. Tractions suffer less by adverse business conditions than railroads and industrials, but telephone earnings are seemingly not affected at all. This is very clearly shown by the earnings of the telegraph and telephone companies during the hard times of 1893, when all other business suffered to a very marked degree.

The earnings of the Western Union Telegraph Company in 1892 were $23,706,404, in 1893, $24,978,443; of the Commercial Cable Company, in 1892, $1,890,377, in 1893, $5,407,639; of the American Bell Telephone Company, in 1892, $15,467,160, 1893, $16,994,730. This was prior to the time the Independent telephone people installed their first exchanges, and they were, therefore, not a factor as competitors. Here, however, are the three companies which were in the telephone and telegraph business during the last depression. It will be seen that the earnings during 1893, the panic year, show a large increase in each instance over the year 1902, which was a good business year. This very clearly demonstrates, to our mind at least, that the telephone is not affected by ordinary business depressions which invariably affect all other lines of business. The earnings of the three companies above mentioned ten years later, or in 1903, were as follows: Western Union Telegraph Company, $29,167,686; Commercial Cable Company, $11,025,633; American Bell Telephone Company, $75,590,340.

There are no statistics at hand to show what the gross earnings of the Independent telephone companies are at the present time, but it is safe to estimate that, in 1903, they earned at least $50,000,000. This amount will be largely increased the present year, as hundreds of new Independent telephone systems are being installed in all parts of the country, and judging from the experience of thousands of other Independent exchanges, it is no exaggeration to say that fully ninety-five per cent of the number will pay dividends from the start.

The history of modern industrialism relates no like instance to the wonderful growth and satisfactory financial success of the Independent movement. Few, indeed, have been the failures among the more than 7,000 Independent companies—in all, less than a score. In the United States there are 4,700 national banks and 1,078 savings banks (World's Almanac, 1904), making a total of 5,778 such banks. It is stated upon authority that the number of these bank failures, during each of the past five years, have exceeded the number of telephone companies (both Bell and Independent) that have failed in that entire period. Could a grander tribute be paid to the stability of the Independent movement and the value of Independent telephone securities than this? No other class of business in the world can make such a splendid showing, and no other class of business is of greater permanency in the commercial world, or has a brighter future.

The properties composing the Western Union Telegraph Company were at one time a disconnected lot of lines without any general system. They were afterwards brought together on an operating basis, working arrangements having been perfected between the various companies and individuals until the property was operated from ocean to ocean.

The Independent telephone companies of the country, in many cases, have been using their earnings to take care of needed extensions and improvements, thereby deferring for a few months the payment of dividends, so that the public has been led to believe that they were not earning a sufficient amount to pay dividends, which is not the case, as anyone who will stop to consider the matter will readily see.

The Independents have spent millions of dollars in developing a business that has been changed from a luxury to a public necessity, and the investor need have no fear about the public getting along without telephone service any more than they will do without any of the other necessities.

Investors who buy Independent telephone securities need have no more fear than they would have in handling securities of any other public-serving corporations, and securities in many of these companies to-day are considered the choicest and safest of all the public-serving corporations.

The best data that is available to-day shows fully 3,000,000 Independent telephones in operation in the United States, as against less than 2,000,000 operated by the Bell company. Some time ago Alexander Graham Bell, the patentee of the telephone, when asked how many telephones there were in the country, is reported to have answered, "That is way beyond me. The Bell patents have expired; there are so many companies manufacturing equipment now and the development has been by such leaps and bounds that no one could keep track of the number of telephones." Such is the vast increase in the telephone industry, and the ratio of growth will be more than maintained in the future.

The greatest danger (if danger it may be called) to the Independent cause lies in the fact that the Independents themselves do not realize or appreciate how extensively they have developed the field. They do not appreciate their strength nor the size of the army of people interested in the Independent movement. This army of investors and operators is composed of the wealth, ability and activity of the various states, and nothing can stop their growth in the

future any more than it has in the past. There is nothing the American citizen enjoys better than to feel that he is part of a good organization; his confidence once gained, he becomes a supporter of the cause and the battle is won. The Independent telephone movement is organized along these lines, which invariably brings success, and this universal success is what has made Independent securities so desirable at the present time and such an excellent investment.

Undeveloped possibilities await public appreciation of the telephone.

SPEAKS FOR ITSELF.

The Bell would-be monopoly and its supporters have all along loudly declaimed against the so-called evils of telephone competition and the disadvantages of dual telephony. Evidence has, however, been obtained of a most conclusive and irrefutable character on this subject, which knocks the claims of the Bell company into a cocked hat. The Independent subscribers of 189 exchanges, spread over seventeen of the states, were recently circularized on this matter. Five questions were submitted, and the following is a summary of the replies:

Has competition resulted in better telephone service in your city? 1. By an improved service on the part of the Bell company. 2. As given by the Independent company. Answers: 1. Yeas, 982; nays, 154. 2. Yeas, 1,245; nays, 26.

Has competition increased the number of subscribers? Answers: Yeas, 1,261; nays, 8.

Has competition brought about greater civility and attention? Answers: Yeas, 1,222; nays, 37.

Have rates been reduced by competition? 1. By the reduction of Bell rates. 2. By lower Independent rates. Answers: 1. Yeas, 1,238; nays, 45. 2. Yeas, 979; nays, 120.

Would it be preferable to return to the conditions prevailing before competition? Answers: Yeas, 14; nays, 1,245.

The foregoing deductions were gleaned by TELEPHONY and absolutely need no comment other than to state that, taken as a whole, they form the greatest argument ever presented in favor of the Independent telephone cause.

While many await an interview, the telephone receives prompt consideration.

THE TWO-TELEPHONE BUGBEAR.

The nuisance of two telephones, if they are served to the patron by two telephone companies, has been assumed by the Bell company to be self-evident. Independent management has only feebly denied the existence of such a nuisance, or has admitted it, tacitly at least. The Bell company has used the two telephone annoyance and natural monopoly arguments as the central themes of its contention. It is interesting to note, however, that both Bell and Independent agree that the best interests of a business subscriber are served if he has enough telephone service fully to supply his needs; the claim is made that two Bell telephones are better than one, as reducing busy calls, keeping down cost by having one for inward and one for outward service, and in some cases by having both unlimited and measured service, listing the latter first in the directory. The Independent manager agrees to all this, only asking that he be allowed to supply the two telephones. It seems to be the claim that two of one kind are very good and one of each kind is very bad.

We are wondering whether one of each kind is after all such an unmitigated evil. In certain cities there is published a joint directory, both numbers being given with each name having both services. In our own experience there are advantages in this. If one has a bias at all in favor of one or the other service he can indulge it, after looking up the name in the one book; if he fails to get the called line he can revert at once to the other service. In the case of a catastrophe putting the central office or some vital part of the system temporarily out of service, the one-company subscriber is wholly isolated, while the favorable chances of escape for the patron of two services are very great. The recent New York subway fire and past central office disasters elsewhere emphasize this point.

All this is apart from the thoroughly answered question: "Does competition lower the price?"

The telephone places the commercial force of the metropolis at your call.

THE USE OF TELEPHONES.

Failure to adopt the use of telephones indicates, in a general way, a backward condition, a lack of enterprise, in any modern city. On the other hand, a general use of telephones in any community shows a spirit of progressiveness. In the former case it indicates that the people are in the habit of wasting their time running about from office tc office, instead of calling up by telephone those with whom they are doing business and getting or giving information without loss of time or energy. It means that women are more tied down by housekeeping cares, since they must do their shopping in person or else delegate such duties to others, when with the convenience and advantages of telephone service they could order things sent, and transact many little errands that continually demand their attention. It means that newspapers are prevented from covering local territory so quickly and thoroughly as they otherwise could, since it becomes necessary to keep a staff of reporters on the jump, instead of getting their information speedily and effectively over the telephone. It explains, in fact, the unprogressiveness of many of the eastern communities as compared with the hustling towns of the great west.

No doubt the fact that in many of the communities of the west and middle west—the stronghold of the Independents—the majority of the people are young and active accounts in a measure for the more general use of telephones in the latter sections, for this younger generation has been educated to the idea that time is money, and they, therefore, appreciate the great advantage of doing business and attending to errands in the quickest and most expeditious manner possible. In the east the number of persons well along in years and retired from active business is much larger, and these persons, as a general rule, are not telephone users.

Statistics which have recently been prepared concerning the use of telephones in the larger cities of this country reveal some very interesting information and bear out the foregoing statements. For instance, it is shown that as a rule western cities are far ahead of eastern communities in the use of telephones, or, in other words, a far greater proportion of the population in western cities are subscribers to telephone systems than in eastern cities, which is due in a very great measure to the progress of the Independent movement. In the list of the ten largest telephone using cities of the United States nine are found to be situated west of the Alleghenies. The only one of the east, and that stands at the bottom of the list, is the enterprising little city of Springfield, Massachusetts. Directly above Springfield appears Dayton, Ohio. The best telephone user of all is Los Angeles, below which come in order Seattle, San

Francisco, Portland, Oakland, Peoria, Denver and Salt Lake City.

Of course with such a favorable showing for the west in this respect it causes no surprise to find that it is continued throughout the entire list of larger cities. And this is verified by a list of ten of the smallest users of telephones, figured out on the per capita basis, which shows that the east is much more strongly represented in this particular than is the west. At the very bottom stands Baltimore, although a close second is found in the case of Fall River, while Camden, Troy, Paterson and Elizabeth are not far behind.

The only western cities included in this list are St. Joseph, Missouri, St. Louis and Des Moines, all towns in the middle west, where, for some unaccountable reason, the telephone idea seems not to have taken hold so well as in other places. In many places it is claimed that competition has served to quicken interest and increase the number of telephone users. Among the four largest cities of the country it is a somewhat notable fact that Boston, the original home of the Bell Telephone Company, leads in the greater per capita use of telephones, excelling in this respect even the hustling city of Chicago. One person in twenty-five in Boston has a telephone; one in twenty-nine in Chicago; one in thirty-one in New York; one in thirty-four in Philadelphia. New England, though less generally progressive than the west in this regard, appears to surpass the middle Atlantic states.

The telephone brings to the isolated country home a sense of security, and makes the residents of a whole county neighbors.

THE TELEPHONE AT THE WORLD'S FAIR.

There are off at St. Louis. The Louisiana Purchase Exposition is the favorite, and though a little ragged in starting, is getting nicely into her stride. She will come under the wire easily a winner, the board showing World's Columbian Exposition second by an eyelash; Pan-American, Trans-Mississippi, Cotton States, Midwinter and Centennial also ran, Paris floundering badly.

Like its predecessors, this fair opened at the touch of a telegraph key. Like them, electricity will do its share to make the pageant gorgeous. At the Centennial the telephone was seen by a very few and heard by fewer. At Chicago in 1893 a pavilion of good size, within the Electricity building, was devoted to a practical and historical showing of telephone progress; outside this exhibit of a single company, a few hundred dollars would have covered the value of telephone displays. The exhibiting company had been in the business for fifteen years, yet there was then no thorough telephone development of even the great cities; in the small towns and in the country none at all.

The St. Louis fair's telephone displays are a great show in themselves. The Independent exhibits, taken as a unit, stand for a telephone development of the country many times greater, after their eleven years in the field, than was accomplished by the original monopolist company in fifteen years.

A moment's delay is easily forgotten amid gratitude for the high privilege of telephoning at all.

INDEPENDENT DIRECTORY PLAN MEETS WITH FAVOR.

The plan of TELEPHONY, as set forth in the April issue, to compile and publish a directory of all the Independent operating telephone companies in the United States, has met with approval on all sides, and the appeal to Independent managers to furnish data in regard to their exchanges, as an aid in compiling the proposed directory, has brought hundreds of responses, but there are still other Independent managers that were addressed by TELEPHONY in this matter, who, for lack of time undoubtedly, have not sent in the statistics as requested.

It would seem that every Independent telephone man in the country, did he but realize the importance of TELEPHONY'S undertaking and the incalculable benefit to be derived by himself and the Independent cause at large from a work of this sort, would grasp at the opportunity to give what little assistance is asked of him in furnishing material for it. While its compilation will entail a vast amount of work on our part and the expenditure of a large sum of money, we shall feel fully repaid in the knowledge that our efforts have shown to the world, by irrefutable statistics, the vast extent of the Independent movement, and given the Independent propaganda fresh impetus. Our motives in desiring to publish a work of this sort are purely and altogether unselfish, and the trifling assistance we ask of each Independent manager in helping the worthy cause should, it seems to us, be cheerfully and promptly vouchsafed.

Not a week passes that TELEPHONY does not receive from a dozen to fifty letters from bankers, capitalists and investors of all sorts asking for facts and figures about different Independent telephone exchanges, as well as statistics regarding the Independent situation in various states, districts, counties, cities, towns, etc. These men doubtless have in mind the idea of making investments in Independent securities, or seek data to aid them in the work of furthering the Independent cause by establishing new exchanges, or forming companies for that purpose. Very often, owing to the fact that we have been unable to secure anything like reliable information regarding certain Independent exchanges, we are forced to hazard more or less of a guess in reply to some question or questions, whereas, if managers would comply with our request and each send us a brief description of their respective exchanges, it would do away with this uncertainty and help, in addition, to disseminate the gospel of the Independents.

To make a long story short, what TELEPHONY desires of the managers of Independent systems, large and small, throughout the country, is that they shall send in to this publication at the earliest possible moment the facts and figures in brief regarding their exchanges. We do not expect that each of these officials will sit down and write a long letter on this subject (though, of course, such an act would be appreciated), but simply, in as few words as possible, tell us the main facts about his exchange—above all, the number of subscribers. A local telephone directory often gives all this, and by mailing us one it will answer the purpose, and the sender will not only earn our gratitude, but will have the satisfaction of knowing that he is aiding in a good work. The information that each Independent telephone manager will later gain, when the directory is published (which all depends upon the volume of responses to TELEPHONY'S appeal) will repay him a thousand times over for his effort in supplying us with the desired data.

Every Independent telephone man wants to know what other Independent operators are doing, but few of them realize to what mammoth proportions the Independent movement has grown. They have seen it stated repeatedly perhaps that there are more than 7,000 Independent operating telephone exchanges in the United States, and that 3,000,000 Independent telephones are in use throughout the country, but beyond these few facts their ideas of the extent of the Independent movement are too often of a vague sort. It is because of these existing conditions that TELEPHONY is planning to issue a directory of all the Independent telephone companies in the United States, in order that a full and complete knowledge of the Independent movement may

be placed in the hands of every man identified with the cause; and no one will deny that a work of this sort will be of priceless value.

As the leading Independent telephone publication in the world, it was quite natural that TELEPHONY should essay this task, and the encouragement we have already received is proof that the move on our part is a popular one. We fully appreciate the efforts of our friends thus far in contributing to the success of the plan, and trust that the response to this second appeal will be as generous as was the first.

The telephone creates the panoply of rank and gains the ear of seclusion.

MORE OF THE SAME.

And still they come.

TELEPHONY continues to receive suggestions for a perfectly derived word that shall intelligently and satisfactorily describe a conversation held over the telephone. In April we presented the word "telelogue" as having been offered for a starter. In May out of a score or more suggestions received "telephogram" was given by this publication as the best of the contributions. This month TELEPHONY has received many replies to the original question, and from the number at hand has selected two as more nearly meeting the requirements of the case than any others in this consignment. E. C. Cole of Cody, Nebraska, suggests the word "phon-o-gram" (a good one, by the way), and says in this connection:

"Regarding a word to intelligently describe a conversation over a telephone, I have been an interested reader of the various arguments, etc., and have a word which I would suggest if it has not been heretofore mentioned. I wish to know why the word 'phon-o-gram' would not be very acceptable? The objection I notice to the word 'telephogram' is the similarity to the word 'telegram.'"

I. K. Norstrom of the Automatic Telephone Company, Chicago, after giving the matter much serious, prayerful thought and delving among the Latin roots for hours, has handed in "vocalgram" as the result of his labors.

One writer suggests common, plain, everyday, simple "phone," the much-abused corruption of the word "telephone," and says in support of his entry:

"I wouldn't give the snap of my finger for all the high-flown suggestions that may be made in this connection. They're all tongue-twisters at the best, and, anyway, the matter has gotten too far along to attempt, this late in the day, to settle on a new word to describe a conversation over the telephone, and then get the public to accept it. Select some fancy combination if you will, but you'll find just the same that the busy American people will continue to call a conversation over the telephone a 'phone.' It's as easy to say as 'pie' and it covers all the points in the case. How often have we all heard the expression, 'I just phoned So-and-So,' or, 'I received a phone?' They may not use the expression 'phone' in effete Boston, but here in dear old Chicago it seems to be good enough for the average run of the *hoi polloi*. On general principles 'phone' has them all beaten a mile at the start."

And there you are.

DISEASE GERMS IN TELEPHONES.

Believing that disease germs lurk in telephone mouthpieces, Health Officer Ragan of San Francisco directed Inspecting Physician E. R. Tillman to swab out mouthpieces of public telephones and give them to the city chemists, for the purpose of making cultures of bacteria, to determine the danger of contagion.

Dr. F. G. Canney, bacteriologist for the board of health, after making thorough examination of the swabs, reported to Health Officer Ragan that cultures had been made and that four out of five of the telephones showed bacteria. From the telephones in the Ferry building, the Harbor Receiving hospital, one at Waller and Stanyan streets, and another in the North Shore depot, staphylococci bacilli were developed; streptococci were developed from the two first named, and saprophytes from the third. Streptococci and staphylococci will produce ulcerated sore throat.

Dr. Canney found germs thriving in the mouthpiece of his own telephone. He recommended that mouthpieces of all telephones be covered with carbolized paper or some arrangement which can hold a disinfectant. Health Officer Ragan has notified the telephone company to guard public instruments from contagion.

THE SONG OF THE TELEPHONE MICROBE.

A microbe fat on the mouthpiece sat of a rusty telephone;
He wore a grin and a leer of sin, when he didn't scrooch up and groan
He wasn't big, but he danced a jig whenever the instrument rang—
"Oh, it's nuts for me!" he would shriek in glee; and this is the song he sang:

"Oh, I am the King of the Microbe Ring, and it's here we have our lair—
We crawl and we creep, and we never sleep; we're a foxy lot, I swear.
We lie in wait both early and late, and we love the gloom of night,
For it's then, forsooth, that we grit each tooth, and prepare to bark and bite.

"In the depths of the 'phone we are deftly thrown by a lot of garrulous folk,
Who unload us in this place of sin, and seem to think it a joke.
But revenge is sweet and you cannot beat a microbe at that game,
For we hatch a plot on the very spot, and—get there just the same.

"There are hid in the gum on this mouthpiece bum ten million and microbes two.
(Now this is a hunch—steer shy of the bunch); they're a savage lot all through.
When a voice they hear each cocks his ear, and a race for the speaker begins—
They jump on his face, or any old place, while he, all innocent, grins.

"Then a few days pass—just a few, alas!—and he's taken with a pain;
He is filled with dope and the doctors hope that he'll soon be up again.
But they little know how we thrive and grow on their toothsome powders and pills—
We're the doctors' friends from beginning to end, for we add to the length of their bills.

"Not a sign of woe does a microbe show when he sees his victim laid
In the cold, cold ground, with the grass all 'round, by the sexton with his spade.
Oh, it's thus that we slay, be it night or day; no compunction do we feel,
For a microbe bold, whether young or old, will die for a good, square meal.
"Oh, I am the King of the Microbe Ring, and I speak for the whole blamed crew—
We never sleep, though the gloom be deep—and here's where I lunch on you!"

So beware of the "mike" as you airily hike to streptococcis' rubber flat;
Take a poisoned rag—give the bug a jag—saphrophytes can't stand that.
Let it not be said, after you are dead, that your end was peculiarly like
A man who'd been bit and who'd died in a fit brought on by a telephone "mike."

The "hello girls" of the Mt. Vernon (Ohio) Telephone Company have decided on a neat attire for the summer months and each young lady employe will dress alike. Blue skirts and white shirt waists with white collars will complete the attire.

DIGEST OF TELEPHONE LITERATURE

Conducted by Samuel G. McMeen.

Corporation Telephones.—Electrical Times, April 21.

On April 12, a paper by A. R. Bennett was read in Glasgow before the local section of the I. E. E. The paper is largely historical, treating of five municipal telephone experiments in the United Kingdom. The details are interesting outside of the immediate municipal connection, as is also true of the discussion, in which Herbert Laws Webb took a principal part.

FINANCIAL AND ECONOMIC.

Independent Telephone Equipment.—REBER.—*Finance, April 30.*

Under a longer title, comparing the equipment made by Independent manufacturers with that made by the Bell company, Mr. Reber contributes an able article. Independent apparatus received the highest award at the Paris and Buffalo expositions. Further honors are expected at this year's St. Louis fair. The policy under which the Bell company might have met the public is compared with logical fairness with that which has followed. The Independent movement began in 1894, and to-day has over 2,000,000 telephones, against 1,600,000 of the Bell company. The author compares the results which might have been expected with those which have been experienced because of the relation of the operating companies to their source of equipment supply, ascribing to these conditions as a cause much of the advantage gained by the Independent movement.

Guernsey Telephone System.—London Electrical Review, April 29.

An editorial upon the financial showing of the States of Guernsey telephone system. The accounts of the department for 1903 show an investment of $118,200, 1,217 subscribers receiving service, and $9,750 net profit after setting aside five per cent for a sinking fund to cover depreciation, etc. The character of the equipment and overhead construction is reported to be such that five per cent is insufficient, 7½ per cent being the right rate. At the latter rate this public enterprise would show a loss of about $1,500 per annum.

The Patent Situation.—DUNBAR.—*Finance, May 7.*

Four thousand patents have been issued to the Bell company in twenty-seven years. One man has filed over 600 applications; another nearly 200, both Bell men. The author believes the majority of these patents are invalid and says it is probable that this is true of the majority of the rest of the Bell patents. No patents are more difficult of comprehension than those in the telephone art, and no other affords so much room for complicated description. Historical details concerning memorable patents and their litigation fill the closing part of the article.

Operation of a Large Telephone System.—BROWNE.—*Finance, May 14.*

A strong, clear writing, telling just how speech is transmitted by telephonic means; how the science became an art; how it was developed by the monopolists, and wherein they failed to conduct the business on the broadest policy; ethical reasons for the marvelous Independent development are ascribed; 3,000,000 Independent to 1,600,000 Bell telephones are the figures of this authority. Excellence of service is given as the final test by which one or another operating organization must be judged. Details of training of operators, office system, clerical execution, etc., receive attention. The telephonic industry is recommended as warranting investment, and the extension of long distance lines is said to be the most important present development.

Automatic Self-Restoring Drops.—WEGNER.—*Telephone Magazine, April.*

A full description, with drawings, of the form of self-restoring drop, in which there is but one shutter, that being of iron, hinged at the bottom, and allowed to fall to a horizontal position, then drawn to a vertical position through the operation of an extended pole piece. The type described is rather that used in connection with long distance practice than in connection with bridging switchboard practice.

EQUIPMENT.

Condenser Making.—WEGNER.—*Telephone Journal, May 7.*

Early difficulties in laid-up condenser manufacture and details of apparatus used in giving the result. Condensers of this kind are noted as less satisfactory than those that are rolled, pressed flat and encased in sheet metal. Neither are they as cheap to make.

English Telephonic Fire Alarm.—PERKINS.—*Telephone Magazine, April.*

A description of a new system in which telephones and fire alarm circuits are associated, the mechanism being exposed to the public in tight iron boxes. The telephone may be used as an adjunct in giving an alarm of fire, although its co-operation is not absolutely necessary.

Efficiency of Telephone Power Plants.—WILLIS.—*Telephone Journal, May 14.*

The efficiency of a combined motor and generator for transforming current from the commercial voltage to charging voltage varies from 55 per cent to 72 per cent; 66 per cent is a fair average; for strage batteries, a watt efficiency of 80 per cent. The combined efficiency of the motor generator and storage battery taken as a whole results to be 51 7-10 per cent, when the foregoing values exist. Interesting and important details of storage battery installation form a part of the article and are such as do not appear in the ordinary writings upon storage batteries. The electrical relation of the lead lining of battery tanks to the positive and negative plates, the importance of insulation and the effect of grounds on the metal tanks are well covered. Efficiencies and costs of operation of storage batteries charged from commercial mains and by gas driven sets, show respectively high and low values. A saving of 14 per cent may be made by "floating" the battery. This means that the output of the generator should follow the curve of the switchboard current consumption.

Instrument Setting.—WILHELM.—*Telephone Journal, May 14.*

A short illustrated article on tools and methods recommended for instrument setting.

Post Office Telephones.

The controversy aroused by a ruling of the postmaster general with reference to the use of Bell vs. Independent telephones in postoffices, has occupied space in periodicals generally during the month.

Differentially Wound Ring-off Drop.—MILLER.—*Telephone Journal, May 14.*

An illustrated note on a means of adapting a cord circuit to accommodate series lines with low resistance ringers, party lines with high resistance ringers, and either of the combinations which may be set up while maintaining conditions to receive clearing out signals.

Automatic Exchange in Portland, Maine.—American Electrician, May.

An illustrated description of the equipment, which is wholly automatic. The method of operation is described, being similar to that of automatic exchanges previously installed elsewhere.

Battery Lamp for Storage Cells.—DORWIN.—*Telephone Journal, May 14.*

An illustrated description of a means for making an ex-

ploring lamp by combining a small incandescent lamp with a glass tube and a lamp base.

The Telecryptograph.—Electro, Paris, March.

From the description of the device of Malcotti, the character of the mechanism being indicated by the name, being that of a secret telegraph, it is indicated that the device may be used in connection with a telephone line and that the subscriber may utilize either at his wish. He has thus all the advantage of a general printing telegraph communication with other subscribers without any one suffering the burden of a large investment in a wire plant for printing telegraph purposes. The same issue contains a biographical sketch of Ernest Malcotti, who is an electrical engineer and an officer in the Italian artillery.

Munich Telegraph Office.—Electrotechnische—Zeitschrift, April 21.

A well illustrated description of the government postal telegraph office, including drawings and reproductions of photographs of certain of the important features, among which are those of telephone equipment. The article is practically a digest of a considerable volume, which contains exhaustive data upon this installation.

Prevention of Crosses Between Signaling and High Voltage Circuits.—KNOWLTON.—*Electrical World & Engineer, April 23.*

LINES AND LINE CONSTRUCTION.

The introduction of very high potential transmission lines has increased earlier hazards so greatly, and introduced so serious new ones, that standard protective devices may not always protect. Much greater care must be exercised, therefore, to keep high potential and signaling wires sufficiently apart. This problem is much more serious in mountainous countries. Carrying signaling lines on the same poles with power circuits should be avoided wherever possible. If possible, the two sets of wires should be at least three feet apart. A number of types of crossing are described, and the details are clearly outlined. One of the types is that of ending one or the other line on each side of the crossing and connecting through by a short bit of underground work. Methods of collecting and recording facts about crossings are outlined and recommended.

Simultaneous Telegraphy and Telephony.—BRUNE AND TURCHI.—*Nuovo Cimento.*

Describes a device called by the designers a "separator," by means of which either a grounded or a metallic circuit can be made composite for the joint use of telephone and telegraph. The separator involves a repeating coil, resistances and condensers. The fundamental principle of the apparatus is that of differing frequencies and is relatively simple. The article is illustrated with a drawing of the circuits.

Keeping Exchange Records.—BAYLEY.—*Telephone Journal, April 30.*

OPERATING.

A short article concerning cards and loose leaf systems for records of subscribers' equipment, line plant, trouble, cable distribution, etc. The importance of these records is set forth and the facts should be of assistance to those concerned with such matters.

Exchange Directories.—FENNELL.—*Telephone Magazine, April.*

The telephone directory is an important advertising medium for the telephone company, although it is not particularly recommended as a means of making money by selling advertising space. A standard color and design of color and a substantial binding are of advantage. Directories should be issued frequently enough to keep the difference between the lists and the facts from harming the service. Errors should be guarded against. As changes in numbers will take place, an information desk with lines connected to vacated numbers should be provided. Directory delivery should be done with care and old directories should be brought in or destroyed. The means of securing and assisting good service, and the advantage of long distance patronage should be advertised in and on the directory.

The Telephone Scout.—FROST.—*Telephone Journal, April 30.*

By means of a line which may be laid quickly and left on the ground or hung in trees, a scout or scouting party can keep in touch with its detachment of the army. The scout is usually accompanied by an assistant, who operates the telephone, the observer dictating what he sees to his assistant, who transmits it back to the commanding officer. Such an equipment is mentioned as being in use by the Japanese troops.

Operating Rules, Grand Rapids.—C. E. TARTE.

Rules of operation for long distance service. These are well formed, are in the direction of satisfying the patron and securing the greatest efficiency of the circuits, and are carried to sufficient refinement to prevent as well as to eliminate troubles.

Rifle Range Telephone.—WILEY.—*Telephone Journal, May 14.*

An illustrated memorandum of a means of communication between the target and firing points of a range, describing a marked improvement over the former slow methods of signaling the results of shots.

Simple Tone Test Circuit.—BUNDESMAN.—*Telephone Journal, April 23.*

GENERAL TELEPHONE ENGINEERING.

An arrangement of a battery buzzer and other simple appliances to test conductors for good condition, to test out the identity of cable conductors, and to test for grounds after lightning storms.

Testing and Clearing Central Office Troubles.—WEGNER.—*Sound Waves, May.*

Description of a number of kinds of trouble likely to arise in the type of switchboard considered. The causes of the troubles, the symptoms to be observed, and the means of removing the causes, together with certain comment upon carelessness, are the scope of the article.

Impedence and Retardation.—ABBOTT.—*Telephone Journal, April 30.*

The fifth articles of a series. The units of capacity and quantity are described and defined. The relation of the condenser to direct and alternating currents is described with analogies in such a way as to assist persons interested from a telephone standpoint. The relationship between reactances from inductance and capacity as well as the inter-relation between these things, resistance and results, are described with the assistance of tables and curves. There is a reference to the work of Dr. Pupin.

Telephone Engineering.—KELSEY.—*Electrical Review, April 23.*

The third article in the series. The circuits and operation of the early bridging or branch-terminal switchboard are described. The reason for the adoption of the bridging board is given as the necessity of escaping from the shortcomings of the series system; just how the adoption of a bridging system necessitated the use of a locking drop, and one which would restore without the manual assistance of the operator, the relations between the line, the jacks, the drops and the cord circuits, are clearly shown and described. The use of self-restoring drops in connection with trunk and toll lines is set forth, as well as the association of such jacks with auxiliary lamp signals.

The Volt-Meter for Testing.—GREENWALD.—*Telephone Journal, May 7.*

The author points out the advantages of the voltmeter as compared with other less accurate means of testing, indicates the cost of a suitable instrument, and describes in three drawings and a few equations the arrangement of voltmeter, battery generator and keys required to make tests for grounds and crosses, whether permanent or intermittent, and for resistances.

The Automatic Telephone.—ZIELER.—*Electrotechnisches Echo, April 28.*

An extended description of an automatic system of the type most generally used in the United States. The details of the apparatus and the method of its operation are allotted

considerable space. Credit is given definitely to the American inventors who have been most prominently active in the development of the system.

Simultaneous Telephony and Telegraphy.—PEREGO.—*L'Elettrista, April.*

A description of the system devised by the author of the article. Various modifications of the system are described and well illustrated. The reactions which make the method possible are mathematically treated. The elements of the system are the usual ones of capacity and impedance; a line between Milan and Varese, composed of one iron wire of about No. 9 B. and S. gauge, is equipped with telegraph and telephone apparatus, the latter being in the form of three telephone stations.

Telephone Cables with Air Insulation.—SCHMIDT.—*Zeitschrift fur Electrotechnik, April 10.*

A full article on the manufacture of such cables, describing methods of securing a low electrostatic capacity by eliminating as fully as possible all solid matter between the wires. The method is principally based on a peculiar mechanical disposition of the conductors and the insulating material, which is of dry paper.

Kansas City Independent Plant.—LOEWENTHAL.—*Electrical World, April 30.*

A well-illustrated description of the buildings, construction, power plant, frames, racks and switchboards of the offices of the plant in question. It has 750,000 duct-feet of conduit, and 260 manholes. The underground cables are 200 pairs, No. 19 gauge. The main office switchboard has an ultimate capacity of 12,000 lines. The power plant contains a duplicate set of batteries. In the South office is a 700-line present equipment, and in West office one of 800 lines.

Common Battery Telephone Systems.—KELSEY.—*Electrical Review, May 7.*

In this fourth article of a series is treated a type of common battery system having the features of a cut-off relay associated with the line, three conductors through the multiple and in the cord circuits, a repeating coil per cord circuit, a supervisory lamp for each cord extinguished by being shunted while the receiver is off the hook. The author confines himself in this section to the early form of the system in which three batteries were provided, one for current supply to the lines and the others for local signals. Certain of the differences between the transmission afforded by repeating coils and by retardation coils associated with condensers, are made plain. The system described is that of the Bell company.

Automatic Fuse Alarm.—BUNDESMAN.—*Telephone Journal, May 7.*

One of the methods of giving an alarm when a fuse operates. A relay winding is placed in shunt with the fuse; the relay will not operate while the fuse is intact, but will close its contact to give a signal when the fuse parts. This author recommends a relay of two windings, thus serving two fuses with one relay and halving the number of relays necessary.

Protective Devices.—DOMMERQUE.—*American Electrician, May.*

A further installment of a series. Lightning arresters, fuses and heat coils are defined. The cause and character of lightning, the proper form of lightning arresters, and methods of installation of types of protective devices are described. Both central office and substation protective equipments come under treatment, as well as the application of lightning conductors to out-of-door construction.

Measurement of Coefficient of Self-induction by use of the Differential Receiver.—MONTPELIER.—*L' Electricien, April 30.*

An able article inspired by the work of Duane and Lory, which was presented at the last meeting of the American Association for the Advancement of Science in St. Louis. The results possible to be achieved by such a use of the differential receiver are highly praised, and in the opinion of the writer this method is preferable to others. His statement of the advantages of the method are the readiness of securing the necessary elements for making the tests, as well as the portability of the unit.

London Trunk Telephone Exchange.—*London Electrician.*

A serial ending in a late issue. In England the term "trunk" does not mean a line between offices in the same city, but a line such as is called "toll" or "long distance" in this country. A line between offices in the same city in England is called a "junction" line. The office described in this serial, therefore, has an equipment for such toll lines. Incoming calls are written out by recording operators, and then transmitted to line operators. The timing of conversation is done by means of calculagraphs, and each operator serves a maximum of five lines during regular day hours. At night and during other times of low traffic each operator cares for a greater number of lines. This reduction of operating force is accomplished in a convenient manner by transferring the lines entirely to certain concentration sections. At the time of this transfer the method of signaling is changed; the signals in the daytime are on an automatic basis, and at night ringing is used for calling and clearing out. The circuits involved in the trunking systems are such as to permit the lines to meet the more highly organized conditions in the London offices, as well as the less complicated conditions in the provincial offices. They are shown in the articles, together with a considerable number reproductions of photographs of the quarters.

Telephone System for Street Railways.—*Electrotechnische Rundschau, May 15.*

A detailed description of an interesting arrangement of lines and apparatus for the purpose of enabling the headquarters of an electric railway system, particularly an interurban one, to maintain communication with stations upon the lines, and to be placed in communication with cars. The metallic circuit lines are branched to springjacks on poles at intervals, and the car carries a portable telephone. The latter is notable in that it has no generator or battery, all signaling being done as a function of the telephone circuits. Transmission as well is from battery at the end of the line. The system is well worked out.

Differential Telephone for Measuring Inductance.—DUANE AND LORY.—*Physical Review, April.*

The original contribution on the subject of measuring inductance. The form of the circuit is that of a pair of paths, one winding of the receiver being included in each of the paths. Balancing the unknown element of inductance against an adjustable inductance produces silence in the telephone receiver when an alternating current is used. Under the refinements contributed by the authors, an error of as low as 1-50 per cent can be reached. The elements of the system are so simple that it possesses portability and stability, and is easy of manipulation. The parts of which it is made are easily accessible, and in use its accuracy is not influenced by heating effects.

The German technical journals report Professor Cerebotani's lecture at Munich, describing his handwriting telegraph. The system is novel in many particulars, and is interesting in that the currents it uses are so related to telephone currents that it is possible to work this mechanism and the telephone simultaneously over the same line. It is claimed for the apparatus that it will give most excellent results in the transmission of drawings as well as handwriting. It is also claimed that by making slight modifications it can be used as a printing telegraph. It would thus seem to combine the features of the printing telegraph and the telautograph of the late Professor Gray.

It is said that the telephone has revolutionized people's temperaments; the gentle have become violent, the patient impatient, the phlegmatic eager. But we have not yet reached the state of mind, revealed in the Abyssinian edict published at the introduction of the telephone, to the effect that "any young woman who fails to answer a call in five minutes shall have her head cut off!"

All-Cable Telephone Plant.

L. W. STANTON.

ECONOMY was the watchword from first to last in designing the all-cable plant at Austin, Minnesota, especial attention being paid to each detail in the construction with the view of eliminating as nearly as possible the chances for trouble, and thus reducing the cost of operation and maintenance to a minimum. The result is that this plant is probably the most cheaply operated system of its size in the world to-day. Owing to the substantial nature of the construction, the depreciation has been reduced decidedly below that of the average telephone plant, while the first cost is no greater than in any other system.

One of the most important features in the construction of this plant is the great amount of cable which is used, and the elimination of cross-arms and bare wires. By means of an ingeniously designed terminal connections are made direct from the cable at the pole nearest the subscriber to be served. This terminal connects to the main cable through a small lead-covered cable known as the tap cable. The number of wires available at each terminal depends partially upon the number of prospective subscribers to be supplied from this location. From this terminal service wires lead to the subscribers.

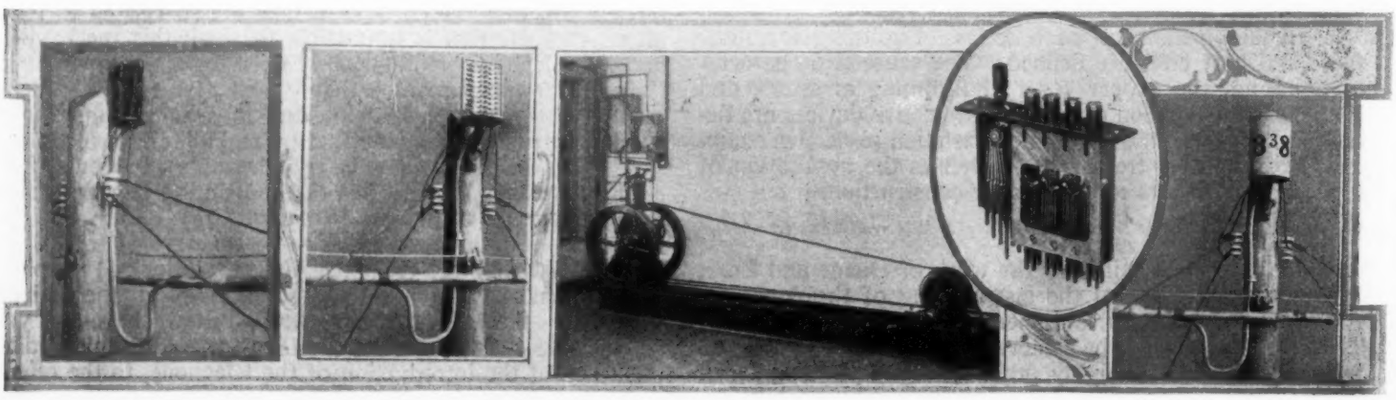
In planning the cable system for the Austin telephone plant, the ratio of fluctuation between large and small groups of subscribers was kept in view. It has been determined in a number of exchanges that small groups of subscribers fluctuate much greater than larger groups, groups of ten lines often fluctuating as much as twenty-five per cent, while in large groups of seventy-five to 100 subscribers, the fluctuation seldom exceeds five per cent. This principle was kept in view when planning the small groups for the individual terminals, the large groups or branch cables making up the main cable.

Under the old method of distributing cables by terminating conductors at one point, it has been necessary to allow considerable margin for fluctuation. If a margin of ten pairs is allowed at each point and the cable is terminated at four points, forty extra pairs would thus have to be provided. If ten pairs are distributed to four points in multiple they will practically suffice for the fluctuation at the four points.

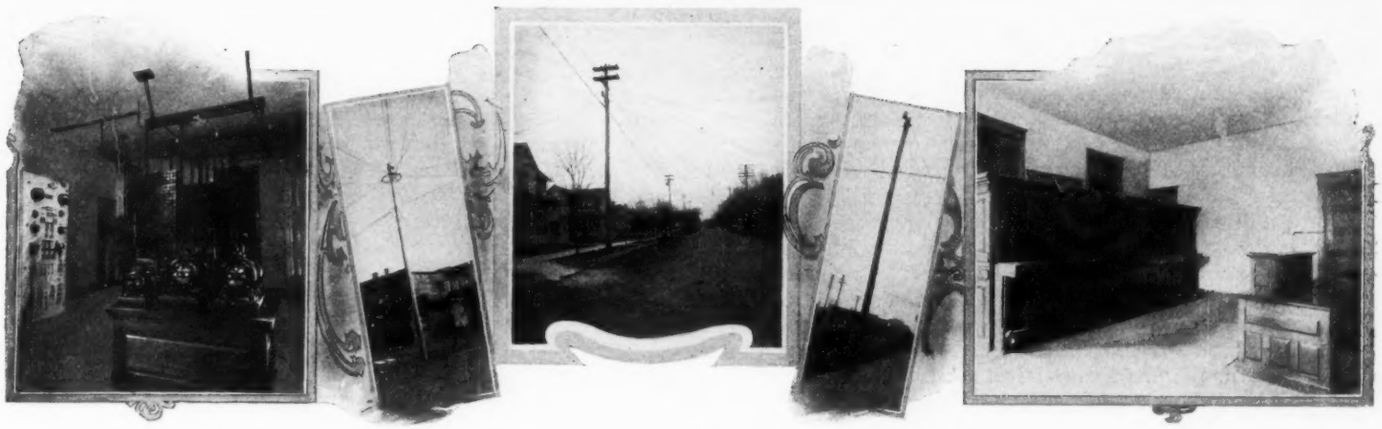
It is stated on good authority that in the old method of cable distribution from twenty-five to fifty per cent of the cable pairs in the plants throughout the country are lying idle. This is due largely to improper planning of the cable system and also to the fact that the number of subscribers in a portion of the district supplied by a cable does not develop to as great an extent as was anticipated by the person designing the cable layout, while in another district supplied by a portion of the same cable the development exceeds the capacity of the cable. This fluctuation is taken care of in a properly planned multiple tap cable system, for each pair of wires may be utilized in a number of different places. One of the cables of 150 pairs in the Austin plant distributes to a portion of the city where the development reached a telephone for every eight inhabitants. In this cable 97 1-3 per cent of the pairs were used, and not a subscriber in this entire territory which it supplies asked for service who did not receive same without delay. Thus a large territory is fed by this cable, and there is no one on the waiting list in one part of the district while in another section which this cable feeds there are vacant pairs, a result almost impossible to be attained by the old method of construction and distribution.

The plant was so planned that it is possible to increase the capacity thirty per cent in this overloaded district at an expense less than one-sixth of that usually incurred in making a similar increase in capacity where the ordinary style of construction is used. All that was required to accomplish this result was to carry a fifty-pair cable less than 1,000 feet from the office to one of the multiple junctions. This relieves the congested district covered by this entire cable, some portions of which were three-quarters of a mile from the office. In the plant at Austin the cable has been extended to every part of the city. The length of the service or drop wire, which is the wire from the cable to the telephone, averages 147 feet. These statements will give some idea of the great amount of cable used in this system.

At first thought cable construction would appear to be much more expensive in initial cost, but, as a matter of fact, it is not. In open-wire construction each wire has to be sufficiently large to support its own weight. In the cable system a much smaller and lighter wire can be used, owing to the fact that the cable is supported by a steel messenger. A mile of bare copper wire, of the size commonly used in outside construction, is fifty per cent more expensive than a mile of 22-gauge insulated with double paper wrapping



DETAILS OF CONSTRUCTION OF OPEN-WIRELESS OR ALL-CABLE TELEPHONE PLANT.



VIEWS OF OPEN-WIRELESS OR ALL-CABLE TELEPHONE PLANT AT AUSTIN, MINNESOTA.

and formed up in a 100-pair copper wire lead-covered cable. It is also much less expensive to put cable in place than it is to string open-wire on cross-arms.

Another economical feature of this system is the fact that cross-arms, braces, insulators, etc., are eliminated, and shorter and less expensive poles are made equally serviceable. The clearance of the cable over trees, or height of the cable above the street, generally determines the height of the pole line. In the old system of construction eight or ten feet of extra pole length is required about the cable on which to attach cross-arms.

There are a number of other features which make this system very desirable. The cost of maintenance is reduced to a minimum, one man is able to look after several times as many telephones, depreciation becomes a small factor, and the flexibility of the system is such as to take care of a constantly shifting or changing telephone population; such a shifting is noticeable to the manager of every telephone plant. Another very strong feature is that of being able to double the capacity for taking care of subscribers in any section of the city at a very small cost. Where the old style of construction is employed, using cross-arms, galvanized iron and steel wire, terminal box, bridle wires, etc., the deterioration is such that the plant has to be rebuilt in a few years. In an all-cable plant, where the material is well selected and the workmanship is of a high order, the life of the plant should be several times greater than a plant built after the ordinary style of construction.

The poles used in the construction of the Austin plant are from "A 1" white cedar stock. They were thoroughly coated from the butt end to six inches above ground with a carboleum compound for preserving the pole where it came in contact with the soil, thus lengthening the life of the pole many years. The messenger wire is of the best quality of double galvanized steel strand, the size varying from three-eighths to one-half inch, according to the size of the cable to be supported. The terminal, from which distribution was made, is of a substantial design and furnishes protection against both lightning and high potential currents, and eliminates, to a great extent, all trouble usually met with in terminal heads. From these terminals connections were made to the subscribers' telephones by means of service or drop wire, which is of the best quality of rubber-covered, braided and twisted, No. 14, hard drawn copper. This class of wire when properly put up has a life of several years, and is considered by companies which have been using such wire for a number of years to be more satisfactory than bare wire. The expense of installing bare wire is almost twice as great as that of installing duplex, owing to the fact that it requires twice as many insulators and twice as much work to run bare wires as to run one duplex. Special attention was paid to install every part of the work in such a way that trouble would be eliminated as far as possible.

The central office equipment used in the Austin plant is of the common battery type manufactured by the North Electric Company of Cleveland, Ohio. The board is equipped with a full multiple, and each cord circuit is equipped with indicating selective keys. This key is an important factor in giving good party line service, as well as saving nearly twenty per cent in operators' salaries. Upon receiving a call the operator answers it in the ordinary way with an answering cord and listens by means of a listening key. After obtaining the number, say 526 L, she connects the subscribers as usual and depresses the L button. If the calling subscriber had called for 536 Y, she would have depressed the Y button. If he had called for 536 (an individual telephone), she would have pressed the button nearest the listening key, this button being wired for ringing the metallic or individual telephone. Upon ringing a subscriber the button used remains slightly depressed for the time being, so that the upper surface of the button remains slightly below the level of the other buttons. By a glance at the keyboard an operator knows by the supervisory lamps that a certain subscriber has not answered; she at once presses the button again, which is slightly depressed, and again rings the subscriber. This indicating feature is valuable in giving rapid and accurate service; otherwise, the operator, after answering two or three other calls, and noting by the supervisory lamp that a subscriber had not answered, would be at a loss to know which one of the four parties on the line to ring (the line being a four-party line). After the conversation is completed and the operator wishes to use this pair of cords for another subscriber, by pressing another button to signal another subscriber the former depressed button is released and the last button used is left, indicating which party she had just rung.

The selective equipment used in the telephone, which is giving exceptionally good satisfaction, was designed and worked out by L. W. Stanton, consulting and constructing telephone engineer of Cleveland, Ohio, who also designed the multiple cable system used in this plant and had charge of the installation of same.

The power plant consists of duplicate sets of charging machines of the special noiseless type, so designed that the storage batteries can be charged at the same time the telephone system is being operated. The equipment and construction work are so well done that the services of only one man is required to look after the entire plant of nearly 600 telephones. Ernest G. Blaine, who is the manager and wire chief, is the only man in the company's employ to look after the central office equipment, telephones and all trouble. Crossed wires and outside construction trouble are almost unknown. Since the plant was installed it has passed

through the winter months with some severe sleet storms, yet there have been but few cases of trouble.

The central office equipment was specially designed for economical maintenance. The power plant is equipped with underload and overload circuit breakers and alarm contacts, making the power system practically automatic, so that the attention of the wire chief is not required when charging the batteries.

The multiple cable feature of the plant has attracted a great deal of attention. A number of the leading telephone engineers and construction men from various parts of the country have looked over the system and have pronounced it a distinct advance in telephone engineering.

The first group of cuts illustrating this article shows views of the Austin plant. From left to right they represent—first, the power board and generators; second and fourth, no open or bare wires or cross arms used—wires distributed direct from cable, from every pole, or wherever needed; center cut, electric light and telephone companies using same pole—cable on pole is equivalent to a lead of five cross arms and fifty bare wires; picture at right shows switchboard equipment at central office.

PATENTS AND INVENTION.

The following is the abstract of an address delivered to the engineering student body of Lewis Institute, Chicago, May 16, by Samuel G. McMeen:

A patent issued by our government is a memorandum of a bargain between the inventor as one individual and the people of the country as another. This bargain is to the effect that because the inventor furnishes to the people a more or less useful product of his brain, they in their turn guarantee to pay him for his effort. The payment is not made in a definite sum of money, but in an arrangement whereby he may enjoy for seventeen years all the profits coming from the use of the thing he has produced. Rights to these profits he may sell or rent to others or make such disposition as he likes, but from the time of the making of the bargain the thing belongs to the people. At the end of the seventeen years the inventor has no further claim on his production and it belongs thereafter wholly to the people, having been bought and paid for.

In a sense, the price paid by the people is set by the inventor. It may be very large or very small, depending on the excellence of the invention or on the caprice of the people. Examples will come to mind of inventions almost trivial, so far as real usefulness is concerned, but which gave the inventor large financial return. There are other examples of inventions which were epoch-making, but because they were too soon for the minds of the people, brought no financial return. It may be that if they had been invented later, so that the period of monopoly had coincided with the period of welcome, the reward might have been proportionate to the excellence of the conception.

The industrial greatness of this nation is in large measure due to the existence of good patent law and to the encouragement which has been given to inventors by its operation. The inventive ability of a people lies not alone in its facility in finding ingenious ways of setting things together to achieve results, but also in its wisdom to see clearly industrial and social needs. In the instance of the inventor who produced the cranberry sorter, every one in the cranberry industry knew the need of sorting so that cranberries for market would contain no soft ones; it required a mental aptitude to see an immediate possibility of invention in the curcumstances that when cranberries were spilled down the back steps, only the sound ones hopped from step to step, the soft ones stopping early.

It is not true that a patent granted by the United States may be renewed. A reissue is not an arrangement by which an expiring patent may be given new life, but only an arrangement whereby a necessary correction may be accomplished. In other countries there are periods of patent life, which, by proper action, may be extended somewhat, as in the case of a copyright in this country, but in each case there is an ultimate time beyond which the term of the patent may not be extended.

An applicant may not secure a patent in this country if his invention has been in actual public use for two years or more before he makes his application. Interesting questions sometimes arise as to whether the use has been really public or might not have been wholly for the purpose of testing the efficiency of the invention by a continued test. A form of sidewalk which had been in use for two years was held not to vitiate the rights of the applicant because, although distinctly in public use, the excellence of its form could only be proven to the inventor by actual trial, and could not be considered to be a final test unless continued for a considerable time. In another instance of an article of wearing apparel distinctly not public in its use, a period of two years was held wholly to vitiate the rights of the applicant because very much less than two years should have sufficed to enable him to decide whether the invention was or was not in a proper form for filing his application.

THE COST OF TELEPHONING.

Did the reader ever fully comprehend, when he goes to the telephone and rings up somebody miles away, the cost that the ringing of that bell entails? He is doing more than holding a conversation with a man in the next town or a woman in the next street. He is making work for engineers and mechanics. Telephony, which now keeps about 50,000,000 inhabitants of the United States within the range of possible communication with each other, has become an enormously complicated organism. The hundreds of millions of poles must be frequently renewed at vast expense, and the switchboards, costing fortunes, are scarcely installed before they have to be remodeled to include some new invention, or flung upon the scrap heap to make way for a more perfect and efficient system.

Telephone companies have discovered by experience that no price is too high to pay for the best possible service, and that apparatus must be properly maintained and kept up to the standard. Various companies, started on the theory that wires and equipment will not be affected by storms or accidents, or that a switchboard once installed will become a permanent source of revenue, have frequently come to grief because they have not correctly gauged the requirements of the telephone-using public or the expense of maintaining and developing a satisfactory system.

When anybody telephones over a long distance, as from Cleveland to St. Louis, he is getting exclusive use for a few minutes of a piece of property that has cost, perhaps, half a million dollars and is getting the services of about twenty-five people. We sometimes complain that the telephone rates, especially those for long distance communication, are excessive, but as a matter of fact it is only the practice of one of the most complete systems of economy known to mankind which enables the great Independent telephonic organizations of the country to give the privilege of exclusive use of hundreds of miles of copper wire and all manner of expensive apparatus for a few dollars. Whenever one says, "Toll line, please," he is really entering upon a contract to lease for two or three minutes a very valuable plant. Rates are bound to come down, but they can never come so low as the simplicity of the process of telephoning seems to predict.

SHOPPING BY TELEPHONE.

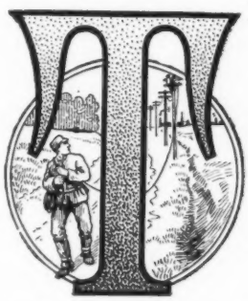
The department store of Marshall Field & Co., Chicago, is celebrated for its many modern contrivances for the facilitation of business. A noteworthy installation is the telephone service, which is said to be the largest private telephone exchange in the United States. Over 300 telephones are used in this immense establishment. On every floor, and serving each separate department—the department being further subdivided into aisles—are located telephone instruments by which the shopper can communicate with the outside world at a moment's notice. The company operates its own exchange and has an extensive intercommunicating system.

A very modern feature of this service is the provision by Marshall Field & Co. of expert shoppers, who may be called upon, through the medium of the telephone, to execute purchases for out-of-town or local patrons who find it impossible to make the trip to the store.

The percentage of failures in the Independent telephone business is so small that it can be stated as being practically nothing.

The Telephone in Foreign Countries

BRITISH TELEGRAPHS AND TELEPHONES.



THE Postmaster - General recently asked Parliament for $15,000,000 for the extension of the government's telephone system. The Postmaster-General also admitted in debate that the government was negotiating with the National Telephone Company for the purchase of their business. According to the newspapers, there seems to be a general opinion in Parliament that the telephone people are a very clever lot of business men, and for this reason, it is said, the Postmaster-General has consented to the appointment of a select committee to see that the interests of the government are not jeopardized in the transaction.

The telephone system of the postoffice department, as now operated, has cost £4,300,000, and a further investment of £3,000,000 has been authorized for extensions in London and the provinces. The London telephone service is contracted for by at least 90 per cent of the users on the basis of a fixed charge of £5 per year, plus one penny per call for inner London, and two pence per call for outer London, or an average of about £8 per year. The London system netted last year only £6,155, allowing nothing for an interest and depreciation charge of £60,780.

The government's telephone and telegraph systems in Great Britain last year cost £267,000 more than they earned, allowing for £167,000 received from the National Company as a bonus for doing business. The government has about £30,000,000 invested in telephones and telegraphs, the annual interest on which is about £1,200,000. In other words, government control in this case costs some $6,000,000 per year.

A correspondent of the London *Times* says: "If we had a telephone service in London such as they have in New York or in any of the other cities of America, I venture to say there would, without question, be an enormous saving of time, temper and money; but so long as people are willing to tolerate the execrable service with which we in London are at present afflicted, so long will the authorities take no steps to improve the service."

A conference on the proposed purchase of the National Telephone Company by the government was held in London by representatives of local authorities owning and working municipal telephones. Glasgow, Guernsey, Hull, Portsmouth, Brighton and Swansea all sent delegates in varying numbers.

The meeting passed several resolutions. It did not object to the proposed purchase, if made on reasonable terms, so as to bring telephones within the reach of the general community. It expressed the opinion that local authorities should be encouraged to own and work telephones, and that the government should continue to own and work, and should greatly develop, the trunk lines.

THE TELEPHONE IN NEW ZEALAND.

The first telephone exchange in New Zealand was opened in October, 1881, at Christchurch, with twenty-seven subscribers. Auckland followed twenty-four days afterwards with twenty-six subscribers, and a third exchange, with fifty-six subscribers, was opened at Dunedin on April 26, 1882. The Wellington Telephone Exchange was opened twenty-one years ago. For the first year, 1881-2, in connection with the first three exchanges, the receipts were at the rate of £3,374, and they had increased for the year ending March 31, 1883, to £5,627. In 1897 the business at Wellington had increased to such an extent as to render the establishment of a multiple switchboard a necessity. This provides for 1,500 subscribers, with an ultimate capacity for 4,800, and there are now over 2,000 subscribers there. The subscription charged when the exchanges were first established was £17 10s per annum, which was reduced on January 1, 1883, to £12 per annum. The rates now in force are: For business connections, for the first half-mile, £7 a year; for private residence connections, for the first mile, £5 a year, at exchanges which are open continuously. At exchanges which are not open continuously the charge is £5 a year, for both business and private residence connections. The number of connections throughout the colony for 1887 was 2,042; for 1900, 7,150, and for 1903, 11,718. The telephone exchange subscriptions for the whole colony for the year 1886-7 totaled £15,477, the amount for 1889-1900 was £43,303, while that for 1903 was £70,418. The number of exchanges last year was 791.

SIMULTANEOUS TELEGRAPHING AND TELEPHONING.

The *Electrotechnical Review* of Frankfort, Germany, recently contained an article written by the inventors, Professor Brune and Engineer Turchi, describing a new system of telegraphing and telephoning over the same wire, which has been patented in the principal countries. The essential part of the invention consists in the feature that the existing telegraph wires can be made to serve for telegraphing and telephoning through the insertion of a "differential spool." After a series of experiments, of which those over the Rome-Florence line, a distance of 185 miles, were the most important, the Turin-Vercelli line has been equipped for regular service.

The chief advantage in adopting the new system is that the adjustment of the differential spool to the existing telegraph system is inexpensive. In the near future experiments will be made in London. The official adoption of the system for Portugal is reported to be determined upon; an English company is at present building a widely distributed telephone system in that country, work on which has been stopped temporarily in order to await the results of the experiments in London and eventually use the existing telegraph system for simultaneous telegraphing and telephoning.

The inventors claim the following advantages:

1. Existing telegraph systems need not be changed materially.
2. Telegraph systems of the most diverse kinds—also those which work with rapid and synchronic apparatus—can be utilized, as, for instance, those of Hughes & Weston and others.
3. Only one wire is required.
4. The cost of adjustment is small.

LONDON'S NEW TELEPHONE EXCHANGE.

One of the most interesting sights to the curious visitor to London is the new telephone exchange near the post office, says a dispatch from the English metropolis. Two years ago it had no existence; now there are nearly 10,000 subscribers. There are sixty-four exchanges in the London district, but this one, off Cheapside, is the most popular, for here communication is daily held with exchanges all over the Kingdom, and even with France and Belgium, and

over 60,000 calls are made daily from all parts of London. About 100 girls are engaged here in putting people in London in communication with Glasgow, or Manchester, or Paris, or Brussels, or with the multitude of centers in the metropolis. A gentle hum of voices fills the air of this strange room, which is really one of the great nerve centers of the world. Each girl has charge of 180 numbers, and in batches of three they deal with the calls. When a call is made a tiny lamp glows, the receiver is attached to the girl's ear by the aluminum band she wears on her head like a coronet, and as it conveys the message, she makes reply with the transmitter suspended at her neck, and with the plugs she fills up the notches in the switchboard and places the people in conversation. It is all done with marvelous dexterity, and when mistakes are made they are due generally to the ignorance of the speakers at the end of the telephone, not to the quiet, clever girls at the central, whose work is as impressive, not to say magical, as anything to be seen in London.

GROWTH OF THE TELEPHONE IN EUROPE.

In Europe the telephone is fast distancing the telegraph in point of growth and popularity. Recent statistics show that the increase of the former is much more than that of the latter, an effect which is possibly due to the tremendous increase in the use of the telephone. In Denmark, fewer telegrams are sent now than ten years ago, although telephone conversations have increased over five times in as many years. In Sweden, the revenue from telegrams shows but little increase, while the increase in the use of the telephone was, during one year, ten per cent. In Norway, the same conditions obtain. In Germany, there has been practically no increase in the number of telegrams, while the number of telephone messages increased 65,000,000 during the year 1902. In Hungary, the increase in telegrams during the year 1902 was about 5 per cent. While the increase in the use of the telegraph is slight, in some cases there being a decrease, the figures seem to indicate that the telephone is replacing it, to a considerable extent, for short-distance messages.

LIVE WIRE CAUSES HEAVY DAMAGE.

According to the Mexico City, Mexico, *Herald*, a pole of the Mexican Telephone Company fell, the wires crossing with the trolley cable, causing much damage and imperiling for a time the lives of many people, who were attracted to the scene by the brilliant electrical display.

The intense current of the trolley cable, conveyed by the crossed wires, caused considerable damage to hundreds of telephone instruments in private residences and offices and to the apparatus of the central exchange. After a few seconds the telephone wires melted and fell down, still hanging from either the trolley cable or from other electric wires, thus forming a dangerous net of live wires that placed the lives of scores of persons in peril and caused the suspension of traffic. Some wires crossed with the lines of the Toluca Telephone Company, and the switchboards and instruments of that company in Mexico City, and Toluca as well, were badly damaged.

The accident cost the two telephone companies a large sum. The cause of the accident was that a wire of the electric light company broke and fell upon a cable that supported the pole in question. This cable was melted and the post fell with the above results.

GERMAN FEDERAL TELEPHONE SYSTEM.

United States Consul-General Richard Guenther, stationed at Frankfort, Germany, has made the following report on the German federal telephone system:

The total cost of the German federal telephone system, operated in connection with the German federal telegraph system, is $60,000,000 up to date.

The Kingdom of Bavaria and Wurttemberg are not included, these having their own independent telephone systems.

The longest telephone connection in Germany is the one between Berlin and Paris, 742 miles. Next is Berlin and Budapest, 612 miles; Berlin and Memel, 593 miles; Berlin and Basel, 577 miles.

The following connections are all more than 300 miles long: Berlin with Dortmund, Dusseldorf, Essen, Frankfort, Gleiwitz, Cologne, Konigsberg, Munich, and Vienna; Hamburg with Copenhagen; Frankfort with Paris and Hamburg.

The line between Berlin and Frankfort is the most used—485 communications daily. The number between Berlin and Cologne is 243; Berlin and Vienna, 118; and Berlin and Dusseldorf, 116. In spite of the high fee not less than sixty-five communications daily take place between Berlin and Paris.

BENEFITS OF TELEPHONE COMPETITION.

Regarding the benefits of competition in the field of telephony, as relates to the United States and Canada, the London *Electrical Engineer* says:

Monopoly has nowhere shown itself to be so detrimental to the public good as in the telephone field, as is evidenced by experience not only of this country, but particularly of the United States and Canada. Happily this state of things in the last two named countries has in recent years radically changed by the expiration of the fundamental patents. The remarkable growth of Independent systems in the United States is just beginning to be experienced in Canada, where the future of Independent telephony is looked on as already assured. Looking at the progress in the United States, it is seen how the business has been developed in the past five years by the Independent companies. More Independent exchanges have been established and more telephones put into use during that period than were used during the twenty years previous that the Bell company held a monopoly of the field. The effect of the competition of these companies has been to bring the rates down to a legitimate basis and to give a first-class service.

TELEPHONE NOTES FROM ABROAD.

A telephone line will soon be constructed from Monterey to Topo Chico, in Mexico.

The Grand Trunk Railway is installing a new telephone system over its lines in British Columbia.

The Weyburn Telephone Company of Weyburn, N. W. T., will construct a line from North Portal to Nilestone, and thence to Regina and Moose Jaw.

Official report of the British government telephone system in London and its neighborhood shows that the cost to users is a good deal higher than that of private telephone companies in the United States.

In Vienna, Austria Hungary, telephone call boxes are provided with napkins, bearing the request, "Wipe, if you please." The practice of wiping the mouthpiece of the transmitter is a sanitary precaution.

It is stated that the British postoffice telegraph department has under consideration the question of substituting female for male operators for working the telephone service at night when the time comes for the department to take over the National Company's undertaking.

The Eastern Telephone Company, Ltd., of Sidney, Nova Scotia, at a special meeting voted to increase the capital stock of the company by the issue of 3,000 shares, or $30,000. J. H. Winfield of Halifax, representing the Nova Scotia Telephone Company, agreed that his company would take one-half the new stock issue.

Inspector of Customs C. W. Ide of Bellingham, British Columbia, has assured the promoters of the telephone-cable line between that city and Victoria that there will be no trouble in securing for them a rebate on the duty on the cable wire brought into the United States for the purpose of constructing the line, for under former rulings when the line extends three miles beyond the shore the project is no longer national, but international. This removes the last

obstacle in the way of the promoters to make certain the immediate building of the cable.

The Toronto, Ontario, Board of Control has decided that a competitive franchise shall be granted a telephone company to do business in Toronto, the company offering the best terms to receive the contract. The city will demand right to purchase the system at the expiration of the franchise and also have a percentage of the receipts paid to the city treasury.

The International Telephone Company has decided to establish telephone communication between Victoria, British Columbia, and the mainland. The cable is to be four-ply and will be laid by San Juan, Orca and Lummi Island to Watcom. It is understood that a rate of fifty cents will be charged for a one-minute conversation with Vancouver and sixty cents to Seattle.

A company is being organized at Culiacan, State of Sinaloa, Mexico, to connect by telephone all business houses of that city and different towns of the district. Founders will pay no subscription fees, they having right to a telephone apparatus in their business offices and another in their residences. The cost of the maintenance will be derived from fees paid by other subscribers.

Crusading in favor of improvements in the telephone service of Paris continues. A Berlin correspondent draws a comparison in favor of Berlin. The usual fee in Berlin is $30. In Paris it is $80. In Berlin, affixed to each apparatus, is the number of the nearest fire brigade, and also the nearest ambulance. In Paris, if a person waited to get connection with firemen, the house would probably burn down.

At a recent meeting of the directors of the Oriental Telephone and Electric Company in London it was reported that steady progress had been made by all the subsidiary companies in Egypt, Rangoon and Singapore. The lines approved by the Egyptian government cover 3,500 miles, and the company expects shortly to receive another order for a further extension. In Hong Kong also the business is extending rapidly.

A recent issue of *The Municipal Journal* of London contains a leading article on "Brighton Municipal Telephones," describing this successful undertaking. No charge was made to the subscribers for using the telephones until 750 were installed, but now a charge of $27.50 is made for unlimited service, a limited service being secured for $17.50 and two cents a message. Other rates are also made for different services.

The report of the Telephone Company of Egypt for 1903 states that during the year 133 additional provincial lines were completed on behalf of the government, and further installations of 393 have been contracted for, which are now in construction. The demand for exchange telephone lines in Cairo and Alexandria continues satisfactory, the net increase for the year being 260 lines. A number of private lines have also been erected.

The city of Glasgow telephone system is not a monopoly. It was established on account of the high charges and unsatisfactory service of the National Telephone Company. The city got license from the postmaster general in 1900 to put in a service, and in 1903 had expended $1,334,690. At that time the earnings were only sufficient to pay interest, but the telephone rate has been cut down to just one-half what it was under the monopoly.

A dispatch from Christchurch, New Zealand, says: "Complaints are being made that too frequent use is made of telephones in Dunedin by non-subscribers, and the department is considering whether it will strike off the names of several subscribers. A number of jarrah poles are to arrive in Dunedin about the end of the month, and cables are expected from England to enable the telegraph department to supply return wires to each telephone subscriber. This is to remedy the difficulty of speaking through the telephones caused by induction from the electric tramwires."

Messrs. Siemens & Halske of Berlin have recently patented a telephone which is intended for use exclusively in situations where cross-connections may occur between the telephone conductors and high-tension circuits. The feature of the instrument is that there are no metal parts outside the case which can be touched. Instead, everything is made from either hard or soft rubber, and all the metallic parts of the instrument are contained in a walnut case. The instrument is also provided with high-tension fuses suitable for 3,000, 5,000 or 10,000 volts, depending on the voltage used in the station or district in question.

The English technical papers announce that arrangements have been made for telephonic facilities between a number of large cities of England—including Birmingham, Liverpool, Manchester, Southampton and others—and a number of cities in France, among which may be named Paris, the Paris suburbs, Chartres and Orleans. Service was to be commenced on April 11. The charge has been fixed at eight shillings ($2) for a conversation of three minutes during the day, or, by contract arrangement, for six minutes at night. Service will only be available from postoffice call offices or by subscribers to the postoffice service.

Sweden has solved the telephone problem with a high degree of success. From an official statement recently issued by the government, it appears that the number of instruments in the government-owned system in 1902 was 61,000. The state telephones yielded in gross receipts in that year 1,325,000, while the working expenses amounted to less than $600,000. The balance went to pay interest and to provide a sinking fund for the repayment of the capital. The income averages about $20 an instrument, while the capital cost has averaged about $110 per instrument. The minimum charge for the use of the trunk or intertown wires is four cents for three minutes' conversation. Notwithstanding such a rate, the system has been a paying venture.

An interesting report has been received by the Navy Department from Lieut. Hussey, in command of the escort for United States Consul R. P. Skinner, who recently visited Emperor Menelik of Abyssinia for the purpose of negotiating a treaty. One of the most surprising things in connection with the expedition was the fact that the emperor was kept informed by telephone of the progress of the American party. Three days were spent at Harar, where the emperor's nephew called up his uncle by long-distance telephone to tell him that the Americans were coming. The Americans were met in state outside of the royal settlement and escorted to the emperor, the time arrangement of the programme being made possible by the use of that great civilizing agent—the telephone.

Scouting with the aid of the telephone has become one of the features of modern warfare and is now being made use of by the Japanese. Two scouts proceed from the lines toward the enemy, one, the observer, is a skilled army officer who makes the observations which are transmitted back to headquarters through a telephone line paid out from a reel carried by an electrician of the signal corps. A ground return is used, the ground being made by thrusting a bayonet or hatchet into the earth and attaching one end of the line to it. The electrician carries a battery on his back. He also makes the connections and does the talking. A special conductor is used, which will stand the rough usage. In this manner a scout may be able to stay out a long time and give valuable information without being obliged to make a number of hazardous trips to the front.

PERSONAL

P. J. Korth will install a telephone exchange at Earling, Iowa.

E. E. Voyle has been granted a telephone franchise at Gainesville, Florida.

J. C. Griffin has installed a telephone system at Matthews, North Carolina.

D. L. Prall is seeking a franchise to install a telephone system in Seymour, Indiana.

O. G. Farnsdale is promoting a telephone system at Spring Prairie, Wisconsin.

O. H. Turner has sold his interest in the Howard County (Mo.) Telephone Company.

W. D. Crist has been appointed manager of the Fremont (Neb.) Telephone Company.

William Potter has been appointed manager of the Cass County (Ill.) Telephone Company.

Beason Blair has been appointed local manager of the telephone exchange at Franklin, Ohio.

Thomas Bishop has been appointed manager of the telephone exchange at Jewell, Kansas.

George Blethen is the new manager of the Dundee (Ill.) exchange of the Interstate Telephone Company.

R. L. Harben of Indianapolis is interested in the promotion of a telephone exchange at Marine, Illinois.

Stevenson Ward has been appointed general manager of the Mansfield (Ohio) Telephone Company.

Stevenson Ward has been appointed general manager of the Mansfield (Ohio) Telephone Company.

William Brueske has resigned as local manager of the telephone system at New Rockford, North Dakota.

W. H. Colley of Cleveland, Ohio, has been appointed manager of the Galion (Ohio) Telephone Company.

J. J. Mackin has been appointed manager of the Tunkhannock and Wyoming Valley Telephone Company.

Fred Best has been appointed local manager of the Inter-Ocean Telephone Company at Fairport, New York.

William Donachie has been appointed manager of the Pittston exchange of the Pennsylvania Telephone Company.

F. D. Grismore and D. E. Elliott have purchased the telephone system at Alfordsville, Indiana, and will rebuild it.

S. P. Sherwin, president of the Indianapolis Telephone Company, is touring Europe. He will be absent three months.

M. Frank Trumbull, of the Trumbull Electric Company, has gone on an extended trip to Cuba, Porto Rico and Mexico.

G. C. Candee of Drayton, North Dakota, has sold his telephone exchange to John Scott, the change taking effect June 1.

George Blethen has been appointed local manager of the Dundee (Ill.) exchange of the Inter-State Telephone Company.

John Swartz has been appointed manager of the Elba (N. Y.) Telephone Company. Additional lines will be constructed.

Trimble P. Davis has accepted a position with the Howard County (Mo.) Telephone Company as superintendent of construction.

S. S. Rames has been appointed manager of the Menno-Wittenberg Telephone Company, recently incorporated at Menno, S. D.

George H. Woodgate has bought the local exchange at Slayton, Minnesota, of the Southwestern Minnesota Telephone Company.

G. H. Barnum has succeeded Roy O. Johnson as manager of the Ogle County Telephone Company's exchange at Oregon, Illinois.

C. H. Kopp, C. T. Buchanan and George H. Reis have been granted a franchise for a telephone exchange at Shakopee, Minnesota.

Chris Ottosen of the Humboldt Rural Telephone Company at Ottosen, Iowa, is a candidate for railroad commissioner in that state.

Charles P. Ilsley has been appointed head of the contract department of the Northeastern Telephone Company at Portland, Maine.

Edgar Perdew of Kissimee, Florida, has been appointed manager of the Kissimee Telephone Company, to succeed C. W. Dann, resigned.

S. C. Thayer, who superintended the building of the plant of the Columbiana County Telephone Company, and later was general manager of the system at Towanda, Bradford County, Pa., is at work on the organization of a company to build a plant at Girard, Ohio.

Chester Byler has been succeeded as manager for the Conestoga Telephone Company at Morgantown, Pennsylvania, by Heber Zellers.

John S. Cravens, president of the American Conduit Company, is making a tour of the old world and will be absent several months.

D. F. Deigfried of the Sanborn (N. D.) Telephone Company is making arrangements to extend the system into the surrounding country.

A. W. Larson of Wausaukee, Wisconsin, will construct several rural telephone lines the coming summer in Marinette and Oconto counties.

S. S. Rames has been appointed manager of the recently incorporated Menno-Wittenberg Telephone Company of Menno, South Dakota.

F. R. Wildman has purchased the telephone exchange at Granite, Oklahoma.

J. C. Montieth has purchased the Bloomington telephone plant. Mr. Montieth will entirely rebuild the plant and extend several new lines.

J. E. Eddy, former manager of the Eldon Independent Telephone Company's exchange at Eldon, Iowa, has gone to Butte, Montana, to reside.

A. W. Worall will construct a telephone line from Bushong to Americus, Kansas, and will probably install an exchange at the latter place.

F. H. Snediker, general manager of the New York and Long Island Telephone Company, is seeking a franchise in Flushing, Long Island.

S. C. Thayer, general manager of the Bradford County Telephone Company, Towanda, Pa., has resigned. J. J. Thayer, his son, is now acting manager.

H. C. Mock, of Omaha, is now connected with the Monarch Telephone Manufacturing Company, Chicago, as their Nebraska and Kansas representative.

Hugh J. Dobbs of Beatrice, Nebraska, has purchased the toll lines and personal property of the Interstate Telephone Company in Gage county, Nebraska.

Herbert Briant, assistant engineer New York Telephone Company, has been elected associate member of the American Institute of Electrical Engineers.

Boaz Duncan, W. W. Wollwine and Dr. West Hughes of Los Angeles, California, have purchased the Monrovia (Cal.) Telephone & Telegraph Company's system.

Allen Miller has been appointed local manager of the Bell company's exchange at Hodgenville, Kentucky, succeeding Joe Kirkpatrick, who has been promoted.

A. Meinema, formerly with M. B. Austin & Co., Chicago, is preparing to place upon the market a new selective ringing lockout device of which he is the patentee.

Wilbur H. Johnston, assistant superintendent of the Frontier Telephone Company, Buffalo, N. Y., lectured before the Buffalo society of Natural Sciences recently.

Lon Davis of Cadwell, Illinois, and Ethel Davis of Arthur, Illinois, have purchased the Arthur Telephone Exchange, which has nearly 200 telephones in operation.

J. C. Smith, formerly chief inspector of the Citizens' Telephone Company at Grand Rapids, Michigan, has been appointed manager of the Citizens' exchange in Jackson.

F. D. Phillips, formerly with the Electric Appliance Company, of Chicago, is now identified with the Crescent Company, of which he was recently elected vice-president.

A. W. Buchanan, general manager of the American Conduit Company, has been transferred from the Los Angeles office to the Chicago office in the Manhattan building.

Mort C. Freer, formerly of Galesburg, but more recently of Rock Island, Illinois, has taken a position as manager of the Central Union Telephone Co. at Kewanee, Ill.

Hon. G. Alfred Schoch has been elected president and J. M. Baker secretary of the Snyder County (Pa.) Rural Telephone Company, with headquarters at Middleburg.

Howard I. Crawford has resigned as manager and secretary of the Rhinelander (Wis.) Mutual Telephone Company to become manager of the Wausau Telephone Company.

I. Chute has been elected president and C. D. Chute secretary of the Aitkin-Grand Rapids (Minn.) Telephone Company, which proposes to build a line between those two cities.

John Bonham, formerly manager of the Troy and Honey Creek Telephone Company at Prairie du Sac, Wisconsin, has resigned his position and will devote himself to farming.

Clinton B. Kidder has resigned as manager of the Savannah Elec-

tric Company, Savannah, Georgia, and it is reported that he will engage in mining at Bonanza, Yukon Territory.

Prof. J. W. Humer, principal of the Pawnee, Illinois, schools, will resign his position, to take charge of the telephone exchange at Chatham, Illinois, which he recently purchased.

A. W. Larson of Wausaukee, Wisconsin, has been granted a franchise at Oconto Falls, Wisconsin. He will establish a local exchange and extend lines through the farming districts.

U. G. Townsend, who was with the Bryan Telephone Company, Bryan, Ohio, has resigned to accept a position with the Williams-Abbott Electric Company, Cleveland, Ohio, as salesman.

Robert Doan, electrician of the Columbiana County Telephone Company at Lisbon, Ohio, has been elevated to the position of superintendent of exchanges at Lisbon, Rogers and Negley.

R. G. Richmond, formerly of St. Louis, has succeeded T. O. Roaen as Chicago representative of Waterbury & Company, who have moved to more desirable quarters at 170 Lake street.

Charles L. Poland, former superintendent of construction with the Hamilton County (Iowa) Independent Telephone Company, has resigned his position. He expects to remain in Webster City.

C. E. Stinson, formerly of the Rochester (New York) and Memphis (Tennessee) Telephone Companies, has been appointed general manager of the Toledo (Ohio) Home Telephone Company.

Charles H. Hood, who has been for some time with the Northwestern Telephone Company, of Portland, Me., has accepted a position with the Cuyahoga Telephone Company in Cleveland, Ohio.

A. Fairbanks, of Enderlin, North Dakota, assumed charge of Noxon & Oglesby's telephone interests at New Rockford, North Dakota, succeeding William R. Brueske, who goes to Jamestown.

Howard I. Crawford has resigned the position of manager and secretary of the Rhinelander (Wis.) Mutual Telephone Company to become manager of the Wausaw (Wis.) Telephone Company.

M. H. Spere of Lincoln, Nebraska, has purchased the Sioux City and Black Hills telephone system, which comprises 200 miles of line. It was bought for the Northwestern Telephone Company.

J. M. Oliver, of Orlando, Florida, and others will incorporate the Florida Co-operative Telegraph and Telephone Co. for $100,000 and build a line from Jacksonville to Tampa, with numerous side lines.

Edward Knight has been granted a franchise by the city council of Stevens Point, Wisconsin, for the construction of a telephone exchange. It is his intention to commence work on the system at once.

F. F. Graves and F. F. Boyce are among the incorporators of the Home Telephone Company at San Diego, California, which is to establish a local system. The capital stock of the company is $500,000.

E. T. Roadruck of Brookston, Indiana, has purchased the Cairo Telephone Company's exchange at Battle Ground, Indiana. He will install a new switchboard and otherwise expand and improve the system.

George Blizzard has been appointed manager of the Inter-State Independent Telephone and Telegraph Company's exchanges at Elgin, Dundee, Plato, Center and Hampshire, Illinois, with headquarters at Elgin.

John Van Lieu is general manager, P. Kerr Higgins, superintendent of equipment and maintenance, and Fred Hummel, superintendent of construction of the Home Telephone Company at Los Angeles, California.

V. M. Braschi, of Mexico City, Mexico, dealer in electrical apparatus and supplies, is visiting the United States. Among the material which Mr. Braschi handles is the product of the John A. Roebling's Sons' Company.

Captain George Shaw, who has been local manager of the Interstate Telephone Company at Prophetstown, Illinois, for several years, has resigned the position, and the place will be filled by C. L. Lawrence of Batavia.

J. Heron Crosman, Jr., secretary of the Pennsylvania Telephone Company, will make a two months' tour of Italy and the South of France. Mr. Crosman has been in ill health for some time, and his trip will be a vacation.

Alva J. Carter of George, Iowa, is at present representing the Monarch Telephone Company of Chicago, with headquarters at Des Moines. Mr. Carter was formerly manager of the Ida County (Ia.) Telephone Company.

J. P. Moore, of Columbus, Georgia, who until recently was connected with the General Electric Company, Schenectady, New York, has accepted a position as electrical engineer for a mining company at Durango, Mexico.

Mrs. N. Starkey, who owned two-thirds of the stock of the New Pineville (Ky.) Telephone Company, has sold her interest to Messrs. J. C. Brown and G. S. Brock of Laurel county, who already own the other one-third of the stock.

E. F. L. Benson, who has been wire chief of the D. & A. Telephone system at Pottsville, Pennsylvania, has gone to West Chester, Pennsylvania, to take a similar position. James Thompson of Philadelphia succeeds him at Pottsville.

J. G. Pomeroy, western sales manager of the Adams-Bagnall Electric Company, is now located on the second floor of the Plymouth Building, 303-305 Dearborn street, Chicago. Mr. Pomeroy moved on May 1 from 309 Dearborn street, Chicago.

G. A. McKinlock, president of the Central Electric Company, Chicago, has just returned from a trip abroad. A cruise on the Mediterranean and a sojourn in Rome, Italy, were among the delightful features of Mr. McKinlock's tour over seas.

L. P. Stoutenborough has applied for a franchise to establish and operate a telephone system and exchange in Maroa, Illinois, and an ordinance is pending to that effect. The Farmers' Interstate Telephone Company is also seeking a franchise in Maroa.

George J. Bradley, cashier of the Bank of Norwood, Minnesota, has made application to the village council, on behalf of the Norwood-Young Telephone Company, for permission to erect poles and string wires in the streets of Glencoe, Minnesota.

R. E. Hamlin has been made vice-president and general manager of the Toledo (Ohio) Home Telephone Company, and C. E. Stinson, formerly of Buffalo, has been made assistant manager and superintendent of the electrical and structural department.

John W. Souter, chairman of the business men's committee at Canastota, New York, having in charge the matter of an Independent telephone company for that town, is receiving bids and specifications preliminary to the organization of a local company.

George H. Woodgate of Slayton, Minnesota, has purchased the Slayton telephone exchange from the Southwestern Minnesota Telephone Company. Mr. Woodgate has arranged to connect with the Dakota Central Telephone system for long distance service.

R. E. Hamblin, who has been made vice-president and secretary of the Home Telephone Company of Toledo, Ohio, will also retain the general managership. C. E. Stinson has been placed in charge of the construction work, maintenance and operating departments.

J. Gratz Brown has resigned his position in the right-of-way department of the United Telephone Company of Pennsylvania, and will hereafter represent the Consolidated Adjustment Company of Chicago, as general agent, with headquarters in New York City.

C. A. Wright of Hancock, Michigan, is soliciting subscriptions for an automatic telephone system in Houghton and Hancock and is meeting with excellent success. The installation will not be made until subscriptions for twelve or thirteen hundred throughout the county are received.

Louis F. Philo, who for the past six years has been connected with the Wesco Supply Company, St. Louis, in the capacity of manager of the supply department, has resigned to accept the position of assistant sales manager with the Ewing-Merkle Electric Company of St. Louis.

M. Ugarte, of the engineering and contracting firm of Ugarte & Garcia, Guadalajara, Mexico, is in the United States on business. This firm has large contracts for electrical machinery, and Mr. Ugarte will visit St. Louis, Pittsburg, Chicago and New York for the purpose of placing contracts.

W. L. Hodges, formerly of the Keystone Telephone Company of Philadelphia and the National Storage Battery Company, has been appointed sales manager of the National Battery Company, with offices at 253 Broadway, New York City. Mr. Hodges was associated with Dr. Louis Duncan at the time the Keystone system was designed.

S. G. McMeen was the guest of honor at a banquet given recently by the engineers and heads of departments of the Western Electric Company in Chicago. Mr. McMeen leaves the employ of this company to take up consulting engineering in company with Kempster B. Miller, an announcement of which was made in this publication last month.

C. E. Wakeman, in charge of the trolley and telephone service of the Evansville and Princeton (Ind.) Interurban lines, has arranged a new system of telephone service on this road. By the use of a small device the conductors of this line can telephone to headquarters from any point on the road. The telephone instrument is located in the car, and a fish pole is used to reach up to and connect the wire with the instrument.

H. A. Douglas handed in his resignation as manager of the Citizens' Telephone Company at Jackson, Michigan, to the board of directors at a meeting May 10, being compelled to take this step on account of ill health. His resignation went into effect May 15. The officials of the company, realizing that he had done much to build up the business of the corporation, were loath to accept his resignation. Mr. Douglas will take a rest of several months in the hope that he may recuperate his health. He is a man of experience in the electrical world, especially in the telephonic field, and had built and operated four different exchanges before taking the management of the Citizens' Company at Jackson.

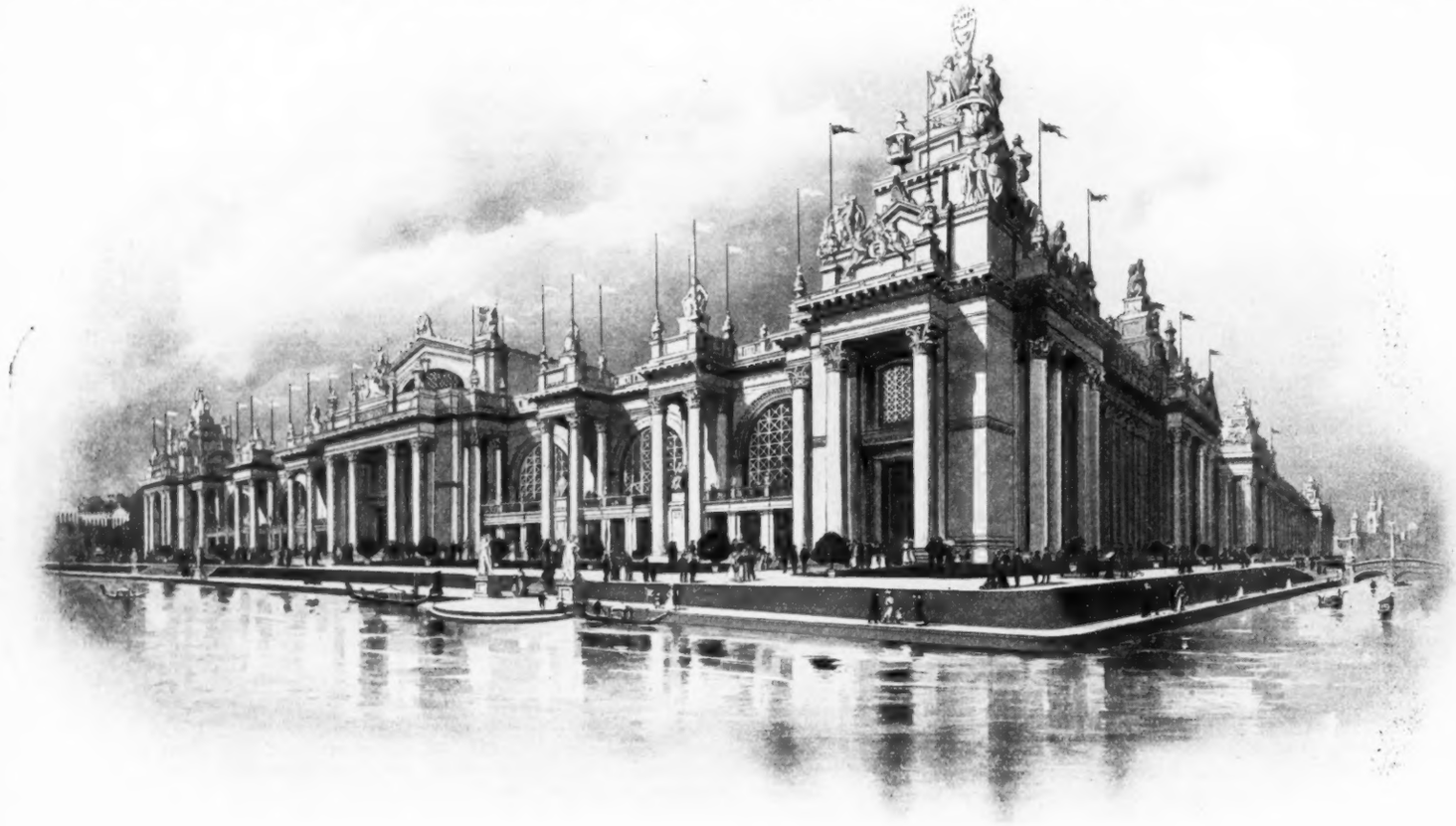
St. Louis and Its Telephone Interests

ST. LOUIS, through the medium of its marvelous World's Fair, has caused to be centered upon that city the attention of the United States—and the whole world, for that matter. No other department of the great exposition has created more interest among the tens of thousands who have already visited the "Ivory City" than the various exhibits in the beautiful Electricity building, in which the display of telephones, telephone apparatus, etc., made by the different Independent manufacturers throughout the country, form such an important part. The acme of perfection in the art of telephone construction, up to the present time, is here seen, and no city in the country figures more prominently among the exhibitors than St. Louis itself. This is to be expected in a measure, as it is a well-known fact that at St. Louis are some of the largest and most prosperous telephone supply houses in the United States, whose growth and success from year to year have kept pace with the onward march of the ever-increasing Independent movement, which has now assumed gigantic proportions.

As a telephone manufacturing center St. Louis is ideally located, its geographical situation being such that it makes it to a certain extent a sort of mecca for those seeking telephones and telephone apparatus. It is largely because of this fact that the telephone supply houses in Missouri's metropolis have achieved such marked success in their respective fields. In addition to location, these manufacturers have shipping facilities that are not excelled by any other city in the land. Add to these salient points brains and unlimited capital, coupled with characteristic western push—the same spirit that has made the Louisiana Purchase Exposition the greatest in the world's history—and it is not difficult to understand why the St. Louis telephone manufacturers are so prominent in the Independent field, and why they have succeeded in building up businesses that are at once modern in every conception, immense in scope, and successful in the fullest meaning of the word.

Among the first to install exhibits in the telephone section of the Electricity building were the St. Louis telephone supply houses. They have spared neither effort nor expense to make their exhibits artistic and attractive, and the praise that has been showered upon them as a whole and individually proves conclusively that their labors have not been in vain. The principal St. Louis exhibitors in the telephone department are: Wesco Supply Company; Commercial Electrical Supply Company; Central Telephone and Electric Company; Ewing-Merkle Electric Company; Controller Company of America; American Carbon and Battery Company; W. N. Matthews & Brother; D. A. Kusel Telephone and Electric Manufacturing Company. Other exhibitors are:

American Circular Loom Co., Chelsea, Massachusetts.



ELECTRICITY BUILDING AT THE ST. LOUIS WORLD'S FAIR.

American Electric Fuse Company, Chicago.
American Electrical Heater Company, Detroit.
American Electrical Novelty & Manufacturing Company, New York.
Automatic Electric Company, Chicago.
Automatic Fire Alarm Company, New York city.
Baird Manufacturing Company, Chicago.
Bristol Company, Waterbury, Connecticut.
Bryant Electric Company, Bridgeport, Connecticut.
H. B. Camp Company, Chicago.
Chicago Fuse Wire and Manufacturing Company, Chicago.
A. Frederick Collins, New York.
Crocker-Wheeler Company, Ampere, New Jersey.
Dicke Tool Company, Downer's Grove, Illinois.
Electric Storage Battery Company, Philadelphia.

Day after day great crowds throng the Electricity building, the visitors always evincing a lively interest in the telephone exhibits. In this connection a word or two regarding this magnificent building may not be out of place. Already nearly all of the displays are in place and working exhibits are the rule and not the exception, which speaks well for the enterprise of those making displays. The exhibitors early responded to the importunings of Chief Goldsborough, and as a result there are shown under this roof more complete exhibits of every character than have ever been gathered together under a single roof. In comparing this with other expositions the exhibitors and the

JAS. S. CUMING, PRES.

C. H. WALLIS, VICE-PRES.

LEO R. BRANDEWIEDE, SEC.

Faller Automatic Telephone Exchange Company, New York.
C. J. Field, New York.
General Electric Company, Schenectady, New York.
G. M. Gest, Cincinnati.
Gould Storage Battery Company, Depew, New York.
Gray Telephone Pay Station Company, Hartford, Connecticut.
Kester Electrical Manufacturing Company, Chicago.
Leclanche Battery Company, New York.
Locke Insulator Manufacturing Company, Victor, New York.
McRoy Clay Works, Chicago.
Miller Anchor Company, Norwalk, Ohio.
National Carbon Company, Cleveland.

department are to be congratulated upon the remarkable showing made on the opening day, when over a score of working exhibits were shown complete and in full operation. The building, taken as a whole, was over eighty per cent complete, and at noon on the opening day, when President Roosevelt touched the golden key and closed the circuit that set in operation the exposition machinery and cascades, this mammoth structure presented a more finished and tidy appearance than any other building on the

W. L. MOASE, SALES MGR.

HENRY WRAPE, PRES.

CARL T. CLARK, MGR.

National Battery Company, New York.
B. F. Wasson, Clinton, Illinois.
Weston Electrical Instrument Company, Newark, New Jersey.
Standard Underground Cable Company, Pittsburg.
Sumter Telephone Manufacturing Company, Sumter, South Carolina.
Nungesser Electric Battery Company, Cleveland.
Queen & Company, Philadelphia.
C. H. Thordarson, Chicago.
Roth Brothers and Company, Inc., Chicago.
Safety Insulated Wire & Cable Company, New York.

grounds. Over 400 men labored during the entire preceding night, and when morning came and the janitor force had gone over the building for the last time, every aisle was clear and in nearly every exhibit space material was in evidence. Hung with bunting and banners, the building presented a very attractive appearance, and soon after the conclusion of the ceremonies on the Plaza of St. Louis, the building was filled with visitors. The value of a working exhibit was soon made apparent by the crowds that gath-

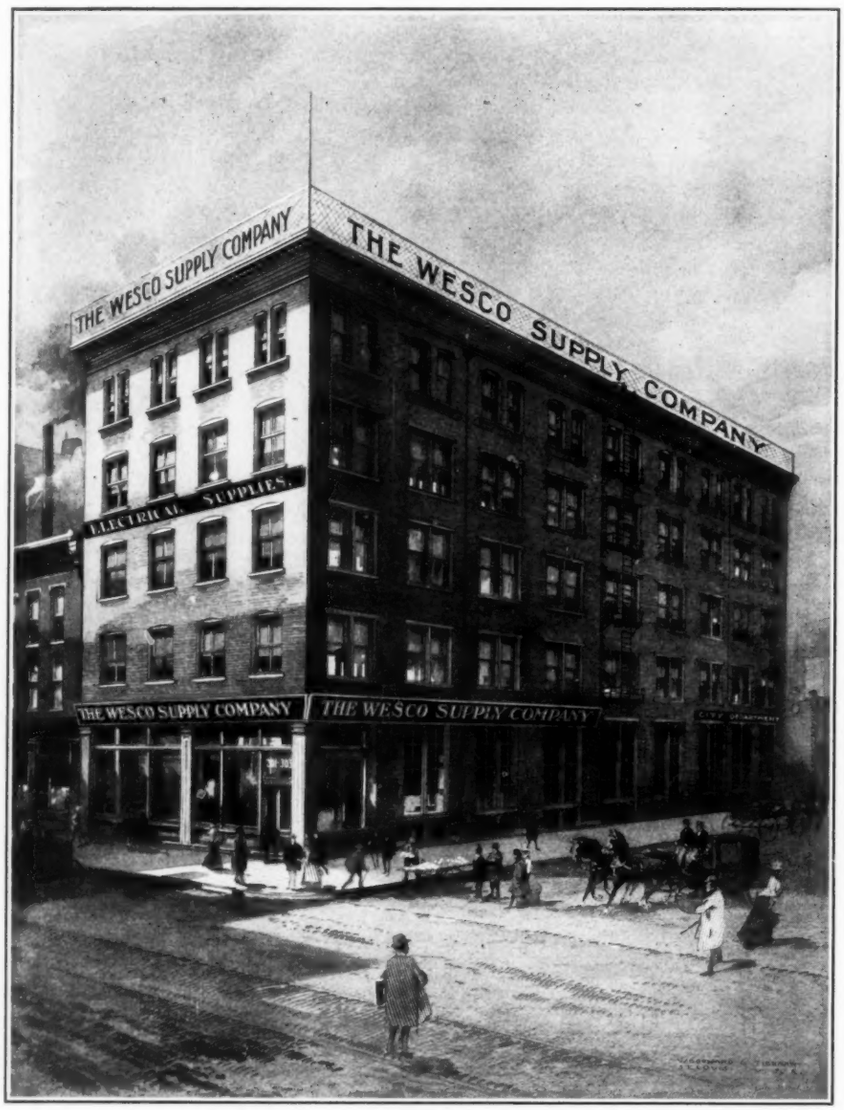
ered around the spaces where machinery was in operation, equally well arranged still exhibits attracting comparatively little attention.

From these exhibits made by telephone supply houses at the fair it is confidently expected that great good will result to the cause of Independent telephony. It will furnish an object lesson to hundreds of thousands of people that the Independent movement, instead of being overestimated, far exceeds any claims that have been made for it, either as to size or superiority over its competitor. Thus will the Independent telephone propaganda receive a mighty impetus, which will result in untold benefit both to the general public and to the telephone manufacturers as a whole.

Appreciating the fact that our readers will be specially interested in the displays made by the St. Louis exhibitors of telephones and telephone apparatus, TELEPHONY herewith presents a detailed account of several of the exhibits:

The Wesco Supply Company, St. Louis, has an exhibit at the World's Fair covering all of section No. 8 in the Electricity building, which is in keeping with their standing and position in the field of electrical jobbers, dealers and manufacturers, at the same time representing the extent of their progress and persistent activity in the telephone business.

The Wesco company was originally incorporated in 1891 under the name of the Western Electrical Supply Company, and on September 1, 1903, the telephone and supply business was sold to the Wesco Supply Company, with R. V. Scudder at the helm as vice-president and general manager, and A. M. Wood as treasurer.



HOME OF THE WESCO SUPPLY COMPANY.

G. A. Knoche, purchasing agent of the company, was manager of the telephone department prior to the organization of the Wesco Supply Company, during which time this important branch of the business received an impetus which has made the name "Wesco" a standard of worth among the telephone men of the country. Since the organization of the Wesco company it has been found necessary to divide the selling end of the business into territories, with a sales manager in charge of each, on account of the heavy increase in the business handled. Mr. Knoche has held the position of purchasing agent, and continues to give special attention to telephones and the materials used in their construction.

J. B. Chopin, who has been with the company for a number of years, has charge of the territory covered by the following traveling salesmen:

R. S. Wakefield, Illinois and Indiana; A. W. Woleben, Alabama and Mississippi; J. W. Reynders, Kentucky, Tennessee and southeast Missouri; G. F. Schminke, R. A. Cook, A. A. Carlisle, V. L. Runyan, St. Louis and vicinity.

V. E. Raggio, who has been the company's representative in Texas until recently, looks after the business in the west, southwest and Mexico, covered by the following traveling representatives:

A. T. Egan, Wyoming, Washington, Utah, Colorado, Montana, Arizona, Oregon and New Mexico; G. W. Cooper, Kansas, Oklahoma and Indian Territory; N. J. Roth, Missouri; A. A. Marrs, Texas; F. S. Wiemeyer, Iowa, Nebraska, Minnesota, North Dakota and South Dakota; Dwight & Spencer, California; J. W. Krueger, Mexico; C. E. Hearne, Arkansas and Louisiana.

W. W. Moore is at the head of the engineering department, and has supervision of the sale of machinery, apparatus and arc lamps, having formerly represented the company in Arkansas and Louisiana.

Charles Scudder, Jr., is manager of the electric railway and mining department, having charge of all matters pertaining to these branches of the business.

J. W. Krueger, in charge of the advertising department, is also the representative for the company in Mexico. He has had supervision of the preliminary work and plans in connection with the Wesco Company's World's Fair exhibit.

A large five-story building, located at Seventh street and Clark avenue, which was built according to specifications, is occupied by this company, but owing to the constant increase in the amount of business handled each year, it has been compelled to secure several warehouses in different parts of the city, in order to carry the enormous stock necessary to supply its trade.

The telephone factory, occupying the fifth floor of the building, has a capacity of 100 telephones per day, and on account of the heavy demand for the "Wesco" product, the company is working its full force at night in order to supply its customers. At present it has orders ahead for over 1,200 telephones. The instruments made by this company are

mostly of the magneto type, both series and bridging, and are made up in about fifteen different styles, the No. 40 series compact style, dry battery telephone being the most popular with exchange managers. The company also manufactures high grade, central energy apparatus.

In addition to a large line of telephone apparatus and supplies, the World's Fair exhibit of the Wesco Supply Company includes a number of the different styles of telephones which it manufactures, installed on talking circuits, which will, no doubt, be readily recognized by the thousands of users of these telephones who visit the wonderful Fair.

The telephones referred to above are exhibited just as they are furnished to customers on orders, and not specially finished and gilded for the sole purpose of attracting the eye. These telephones will be installed for the purpose of making a working exhibit, and it will be the talking qualities of the instruments which will be expected to speak for themselves.

Charles Pickert, who is in charge of the Wesco telephone factory, has had many years of experience in telephone work and construction, his earlier training having been received in telephone exchanges. This is also true of his assistants in the factory, and they know what it is to "shoot" trouble, they being thoroughly familiar with the most important and vital requisites of telephone construction so neecssary to promote the success of telephone exchanges and the good will generally of all telephone users.

It is a fact that in a large number of telephone factories the men receive their knowledge from their factory experience, and are not aware of the usual difficulties met with in the operation of telephone lines. It is, therefore, not unusual for them to very often allow mistakes in wiring instruments to get by them without discovery, which defects are occasionally also overlooked by the testers, resulting in consequent unsatisfactory service and uncalled for complaint and abuse. The men in the Wesco factory have their previous outside experience to guide them in keeping clear of the breakers. The company extends a cordial invitation to all the readers of TELEPHONY to visit its exhibit at the World's Fair, and ascertain what the name plate of the Wesco Supply Company on a telephone or switchboard insures in the matter of perfect mechanism and faultless construction.

CENTRAL TELEPHONE AND ELECTRIC COMPANY.

Prominent among the telephone exhibitors at the Fair, the Central Telephone and Electric Company, St. Louis, has an exhibit that for prominence of location, beautiful appearance and interesting features cannot be excelled. Following is a brief description of this company's booth:

The entire facade is decorated in white with gold trimmings, the company's name appearing in gold letters in the center. On each side appears the well-known "Arrow" trade-mark in red, white and blue. The interior of the booth is decorated in red burlap to the chair rail and above this the walls and ceiling are covered with a light green burlap, small silk flags of every nation being used for further decoration of the side walls. All wood work of the interior of the booth is white. On the side walls are shown all styles of telephone apparatus of this company's manufacture in various woods and finishes, there being five different finishes for each style of telephone—central energy, with and without local talking battery, bridging and series magneto telephones in six different forms, and various designs of desk telephone apparatus.

There are also shown the Central 'Giant" extension bells, extension bells with condensers, and regular types of extension bells. On the pillars and pedestals of the booth are shown the various types of central protectors, in which their well-known patent wrapped fuse is used, single and double line fuse blocks, distributing boards, cross connecting boards, plain and with test clips, self soldering heat coils, etc. Also a full line of the celebrated Becker terminal heads.

The Central Telephone and Electric Company is justly proud of its success in the protector line and is making this department a prominent feature of its exhibit. In the center of the booth a powerful punch press has been installed, driven by an electric motor, on which will be shown the manner of making parts for the protector line, and on a bench in front part of booth will be workmen assembling these parts on porcelain base fuse blocks, which will be given to customers as souvenirs. The company is also well provided with other souvenirs in the form of miniature watch charm receivers, button pins with its "Arrow" trademark on same, and their handsome instrument catalogue, in which are shown various views of the Exposition exhibit buildings, the Cascades and World's Fair sculpture.

The Central Telephone and Electric Company extends a hearty invitation to all telephone men to visit them and make this booth their headquarters while at the Fair, but to those who will be prevented from doing so they will gladly mail free of charge, on request, the souvenirs mentioned above.

To many of our readers the Central Telephone and Electric Company is well and favorably known, but to others who have not had the pleasure of dealing with this firm a brief description of its methods and the gentlemen connected with the company will not be amiss.

The Central Telephone and Electric Company is the outgrowth of the business started by the president, J. S. Cumming, just nine years ago, the business at that time being of such size that two small rooms with about 500 square feet of floor space was sufficient for the first year. At the present time the company occupies an entire building of three floors and cellar, covering 10,000 square feet of floor space and is now negotiating for double this space to be occupied when its present lease expires within a few months.

The sales during the year 1903 amounted to just twenty times the amount of the first year's sales and the outlook and present orders received justifies the company in estimating a large increase for this year. The Central Telephone and Electric Company early adopted a policy of being able to furnish the telephone buyer with everything he may need and not carrying in stock goods intended for electric light and street railway purposes, or soliciting any trade from that class of purchasers, the output being such as to secure the St. Louis agency for the American Steel and Wire Company bare iron wire, the American Electric Works paper insulated telephone cables, the General Electric Company's rubber covered telephone wires, and other high-class supplies.

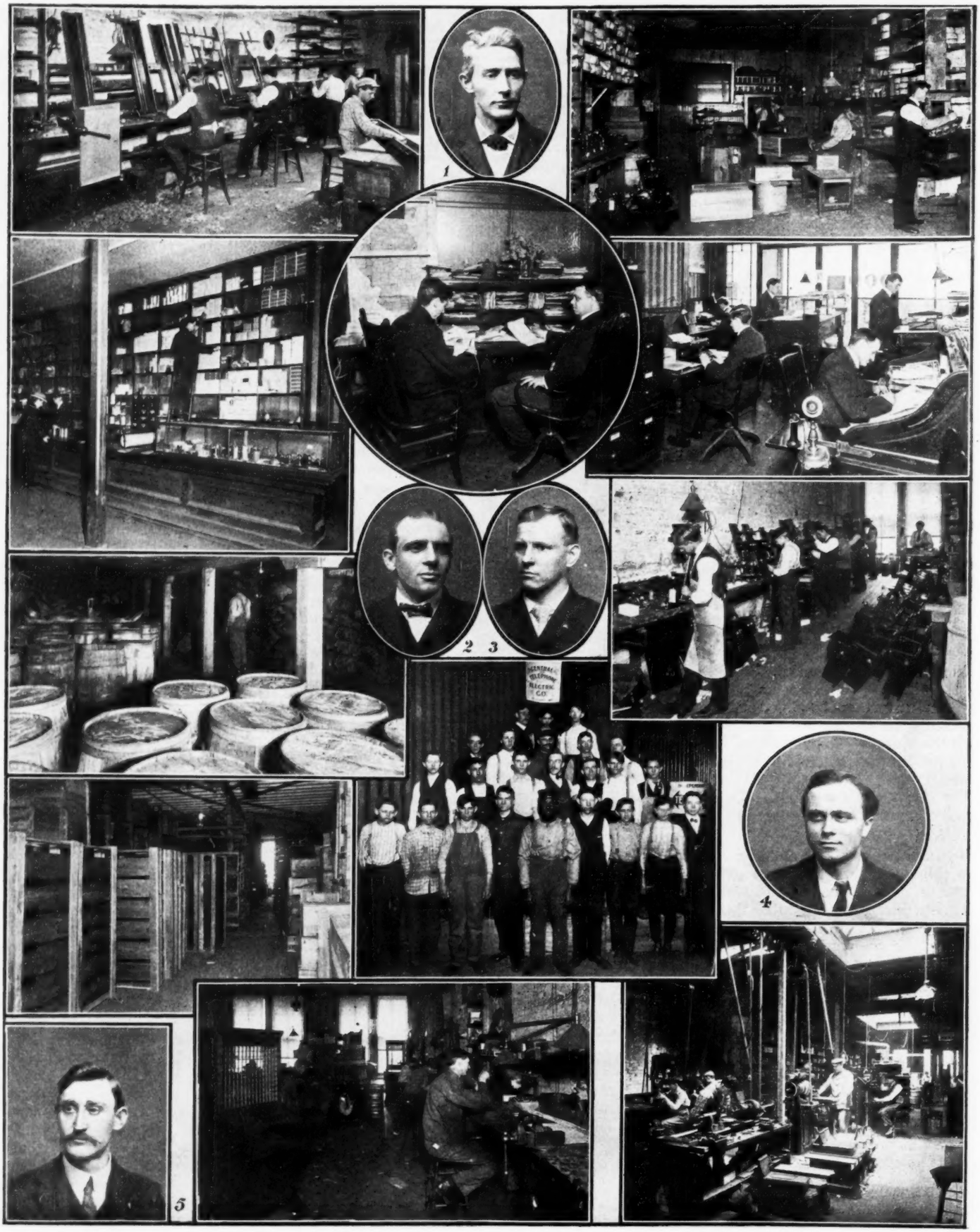
The Central Telephone and Electric Company believes in having high-class men in all its various departments and the gentlemen whose portraits are here shown are well known specialists in their line.

C. H. Wallis, vice president, is the general traveling representative and commands the best trade in the states of Missouri and Kansas. He also has choice customers in Illinois, Arkansas, Indian Territory and Oklahoma. Everybody who knows Charley Wallis has the acquaintance of a Prince of Goodfellowship.

W. L. Moase, sales manager, is an old time electrical man, though comparatively young in years. He served his apprenticeship with the old Detroit Electric Works, and has been actively engaged in the business for the last fifteen years.

J. A. Becker, superintendent, started with Mr. Cumming nine years ago and is still at it. He is the inventor of the Becker terminal head and has been in charge of the factory for several years past.

Leo Brandewiede, secretary, is the financial man, and knows how to collect and pay, and both promptly.



Protector Department.
City and Retail Store Room.
Basement Store Room.
Second Floor Store Room.

President's Private Office.
A Group of Workmen.
Switchboard Department.

Shipping Room.
General Offices.
Telephone Assembling Department.
Partial View of Machine Room.

1.—Homer Wooldridge,
Foreman Telephone Assembling.

2.—J. A. Backer,
Superintendent.

3.—W. F. Gradolph,
Telephone Engineer.

4.—Wm. Hahn,
Foreman Switchboard Dept.

5.—Ed. Hindrichs,
Foreman Shipping Dept.

W. F. Gradolph, telephone engineer, is well known in all parts of the United States as a practical telephone man of the highest order. He has been in the work for twenty years, had his schooling with the Bell company and has been connected with several leading Independent telephone factories.

William Hahn, foreman of the switchboard department, is a side partner of Mr. Gradolph's and would rather trace a circuit than eat a good meal.

Homer Wooldridge, foreman of the transmitter and telephone assembling department, has personally made over 10,000 transmitters and knows when they are right.

Ed. Hindrecks, foreman of the shipping room, has had experience in all branches of the business and knows that telephone goods are usually needed in a hurry.

We also show various illustrations of departments of the Central Telephone and Electric Company, which will give our readers an idea of the company's facilities, which, however, are always on the increase, and it is their endeavor to give entire satisfaction to all customers, large or small.

EWING-MERKLE ELECTRIC COMPANY.

The Ewing-Merkle Electric Company, St. Louis, has been making wonderful strides in the sale of Sumter telephones, switchboards and telephone supplies in the past year, and has an exhibit in Section 14 of the Electricity building that is a great credit to this growing concern.

They are the general selling agents in the west and the south for the sale of apparatus manufactured by the Sumter Telephone Manufacturing Company of Sumter, South Carolina, and their exhibit embraces many different types of magneto and central energy telephones, both wall and desk sets of the standard exchange types, also inter-communicating and hotel telephones, especially adapted to interior systems, together with several sections of their celebrated Sumter "Bull's Eye" express switchboards, hotel telephone-annunciators and toll line switchboards.

This company enjoys the distinction of manufacturing all parts entering into the construction of its entire line of instruments, and a very attractive feature of its exhibit is the beautifully finished and handsome telephone and switchboard cabinets, made in fancy woods from the native forests of South Carolina, and sawed from the logs by this company.

The high development of the mechanical details, characteristic in the products of this company, is readily appreciated by careful inspection of the instruments embracing this exhibit, thus indicating the high electrical and mechanical efficiency for which the equipment of this company is noted through a wide territory, from which it enjoys a large demand for its products. The various parts entering into the construction of the instruments on exhibition are but an average and a fair representation of the standard goods turned out by this company, and any experienced and practical person, who may have the opportunity of examining these instruments, will readily appreciate the neat manner in which they are assembled, and the excellent workmanship and high grade material entering into the respective parts, conspicuous among which in the magneto telephone sets is the very smooth running, noiseless and heavy capacity generators, also the reliable and positive action of the hook switch, the excellent ringer construction and high efficiency of the transmitter and receiver.

The central energy telephones are equipped with the special long distance transmitter, double pole receiver, condenser, etc., and adapted to all common battery systems.

The various types of interior telephones are also equipped with the long distance transmitter, double pole pony receiver of modern construction with concealed cord terminals, unique and reliable gravity hook switch, double gong battery bells of easy adjustment, special induction coil, etc.

The Sumter "Bull's Eye" express switchboards are equipped with the Mason celebrated "bull's eye" drops with inwardly-falling shutters, and embracing many valuable features in reference to jack and drop combination, "bull's eye" signal, accessibility of parts, and simplicity in construction and operation, together with that high grade workmanship and material everywhere conspicuous in the products of this company.

It will pay those interested in the telephone field to make a very careful examination of this exhibit, as it contains many new features that will appeal to every up-to-date telephone manager.

You will receive a cordial welcome and competent attendants will explain all details.

INSPECTING INDEPENDENT TELEPHONE PLANTS.

A party of twelve Pittsburg capitalists interested in the Pittsburg and Allegheny Telephone Company and other Independent telephone interests, recently toured the country inspecting various Independent telephone properties. The party was composed of J. B. Splane of Pittsburg, president of the P. & A.; S. H. Brown, vice-president and general manager of the P. & A.; H. B. Beatty, Senator William Flinn, Senator John A. Weller, Robert C. Hall, D. P. Reighard, Dr. Roger Williams, H. M. Hall, T. G. Davis, G. T. Braden, H. M. Nichols, of Oil City, Pa., John V. Ritts and T. P. Mifflin, both of Butler, Pa.

From Cleveland the party went to Toledo, thence in turn to Grand Rapids, Chicago, Kansas City, St. Louis, Louisville, Indianapolis, Dayton and Columbus.

This trip of inspection by so many prominent capitalists and men of influence led to the circulation of various rumors that a consolidation of the bigger Independent telephone companies of the United States is imminent, but this is denied by those interested. The gentlemen above named have large sums of money already invested in telephone properties and their trip was one of inspection to thoroughly acquaint themselves with the general situation throughout the country. It is the present policy of the Independent telephone people of the United States not to consolidate the local exchanges. The consolidation of the various long-distance systems may come in time.

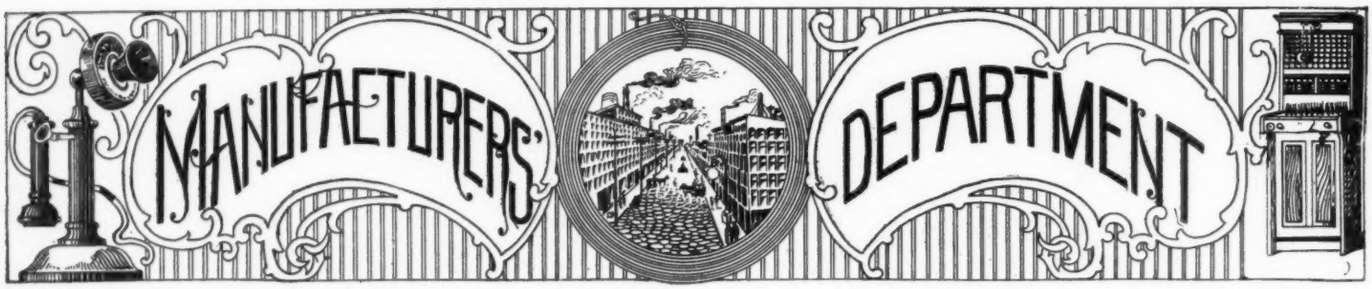
J. G. Splane, president of the Pittsburg and Allegheny Telephone Company, says that he and his associates do not contemplate a merger of all Independent telephone companies, but plan an association, not involving any transfer of stock, to facilitate the long-distance service. The cities directly affected include Chicago, Milwaukee and New York.

THE TALE OF THE TELEPHONE.

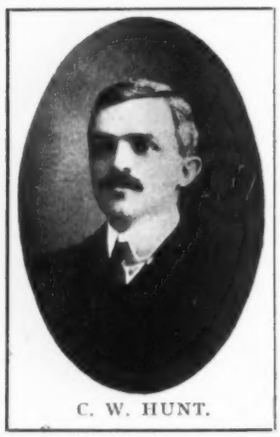
The first telephone that was ever used was not electrical, nor was it a scientific instrument in any sense of the term. About the middle of the nineteenth century the employes of a large factory in Sheffield, England, beguiled their leisure hours by kiteflying. Kites large and small went up daily, and the strife was to see who could get the largest. The twine which held them was the thread spun and twisted by the ladies of the village.

One day to the tail of the largest kite was attached a kitten, sewed in a canvas bag, with a netting over the mouth to give it air. When the kite was at its greatest height—200 feet or more—the mewing could be distinctly heard by those holding the string. To the clearness of the atmosphere was attributed the hearing of the kitten's voice. This is the first account chronicled of speaking along a line.

Carl Dyvig, owner and manager of the Inwood Telephone Company at Inwood, Iowa, writes to this paper as follows: "I am greatly pleased with TELEPHONY and would not be without it."



WILLIAMS TELEPHONE AND SUPPLY COMPANY.

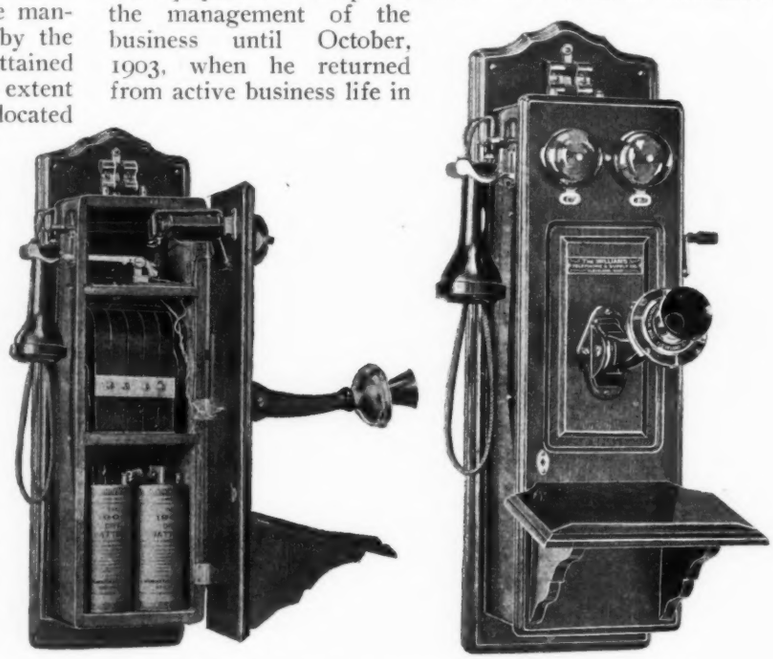

C. W. HUNT.

The Williams Telephone and Supply Company of Cleveland, Ohio, which was organized in 1898, furnishes a fair idea, through its steady and natural growth, of the constantly increasing interest and activity in rural telephone line building throughout the country. Being one of the first concerns in the United States to recognize the requirements of rural districts for telephone lines and instruments peculiarly adapted to their needs, they set for themselves the task of supplying this demand in the best possible manner. How well they have succeeded is evidenced by the enviable reputation and position which they have attained in the business world, as well as the far-reaching extent of their business connections—their customers being located in every state in the Union—and especially by the estimate placed upon their output by the thousands of users throughout the United States. Numberless letters have been received by them from satisfied customers, all of whom have the same story to tell. A number of Independent exchanges have adopted the "Williams" for exclusive use on their lines, some of them using as many as 800 to 1,000 telephones on a single system, and a great many others are rapidly falling into line.

This company has never been over-pretentious, but began business in a modest way in its present quarters on Seneca street, Cleveland, Ohio, although the growth has been such as to make it necessary during the present season to double the operating space; in the near future the entire plant and offices will be removed into still more commodious and better quarters. Their business will be still further increased during the coming year, as they will go into the manufacture of central energy telephones, the drawings and designs for which are already prepared and work will soon be begun on this line.

Much of the company's present success is due to the energetic and capable management of C. W. Hunt, whose experience and training have been such as to make him eminently fitted to occupy his present position of general manager, giving the most careful attention to all details of manufacture and at the same time having entire charge of the sales department and traveling men of the company. Mr. Hunt started out on his own resources early in life, beginning his business career in the commercial line; but after devoting about four years to this, his natural tastes and inclinations led him to change to manufacturing, and in this line he has been eminently successful. From the mercantile line, his most natural entry into manufacturing was as traveling salesman, and the experience gained in this way has been an invaluable aid to him in meeting and dealing with people. His rise has been steady and gradual to the present responsible place which he occupies so acceptably. A goodly portion of his career as a business man has been spent in Youngstown, Ohio, and the people of that lively city can vouch for his ability and integrity.

The Williams Telephone and Supply Company was founded by J. A. Williams, a graduate of the Alabama Polytechnic Institute and a practical telephone man of long experience, having taken out a number of patents in this line. He is also the inventor of the various parts of the "Williams" telephone. He is the author of a valuable little work, "Manual of Rural Telephony," which furnished a great deal of valuable information in a most concise and intelligent manner for parties interested in the construction and equipment of telephone lines. Mr. Williams continued the management of the business until October, 1903, when he returned from active business life in order to take a long and much needed rest, although he still devotes a portion of his time to the business in an advisory capacity.


INTERIOR AND EXTERIOR WILLIAMS TELEPHONE NO. 55.

W. C. Hine, president of the company, is also connected officially with the Cleveland Gas and Electric Fixture Company of Cleveland, but finds it possible to devote the necessary amount of time to consultation with the Williams people when required. Mr. Hine being a man of wide business experience serves as a good balance wheel for the business.

The Williams Telephone and Supply Company employs none but skilled workmen and manufactures each and every metal part which goes into the telephone, thus insuring certainty that every part comes true to gauge and is absolutely accurate and correct in both quality and workmanship. In

order to do this, it maintains its own machine shop and tool room, manufacturing its own tools and dies. In fact, it has been the aim of this concern from the beginning to furnish its patrons the very best telephones that can be made, and in this they certainly have succeeded, as any one familiar with their instruments can testify, their motto being "Not how cheap, but how good." It is also their custom to guarantee entire satisfaction before payment is made for telephones.

The illustrations here given will tend to furnish an idea of one of their most popular styles of telephones (No. 55), which is particularly neat in appearance, and the cut of the interior illustrates in a measure the extreme simplicity of construction and arrangement of parts.

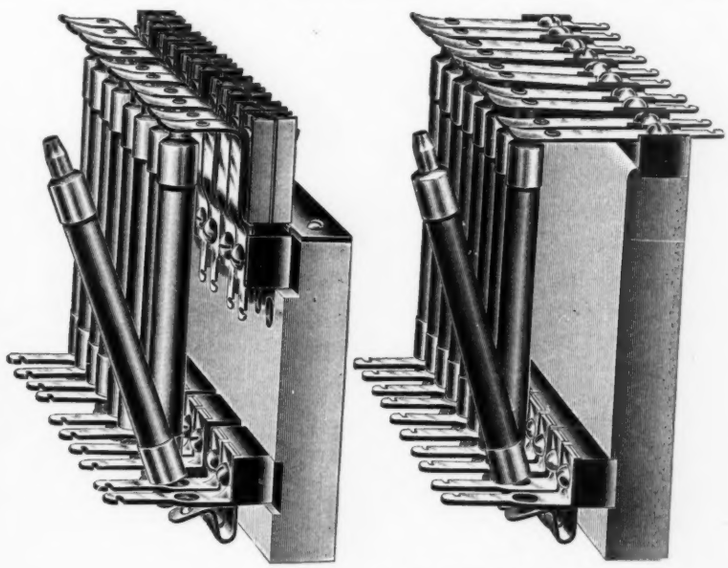
It has always been the policy of this company to treat all with whom it deals with the utmost fairness and confidence, and to this in a large measure its success is due, and the reputation thus gained it has found it to its interest to maintain. TELEPHONY wishes the company continued success.

SOME OF THE STERLING ELECTRIC COMPANY'S NEW 1904 EQUIPMENT.

The Sterling Electric Company, Lafayette, Indiana, has designed a switchboard for use with magneto instruments which enables the operating companies to modernize their central office equipment, bringing it up to date, not materially changing its construction and no changes in the instruments. This appears to be a feature that will appeal to the operating companies which have outgrown their equipment and think it necessary to improve their service. The style of this switchboard is a lamp signal magneto board and is manufactured for exchanges of from 100 subscribers up to 5,000, larger exchanges being multiple boards. The switchboard is designed and follows the lines in construction of their well-known common battery lamp signal multiple switchboard, being constructed of the same relays, jacks, lamps and lamp mountains, plugs, cords, keys and supervisory lights, and is so arranged that should the operating company wish to make its exchange a full common battery equipment at any future time, this board can be used by making a very few minor changes.

100-LINE LAMP SIGNAL SWITCHBOARD.

It is a handsome piece of furniture, the framework being constructed of iron, which is covered with quartered oak or mahogany, highly finished with three coat work, the cabinet being equipped with a brass foot rail. The signals are miniature lamps or electric lights mounted in strips of twenty-five, the signals being mounted in the upper part of the cabinet and the jacks in the lower part, also being mounted in strips of twenty-five, of hard rubber faces and German silver bodies, consequently the signals are never obstructed by cords being drawn across the faces of the same. The keyboard is equipped with from ten to sixteen pairs of cords, each pair being supplied with a single supervisory lamp and a ringing and listening key. There is also one master key upon the board, which is used for the purpose of extinguishing the lamp signals when they become lighted in large numbers on account of lightning or foreign currents. The lamps are operated by means of a relay, which is of such a sensitive nature that it will record the signals through 20,000 ohms resistance.



PROTECTORS FOR CABLES.

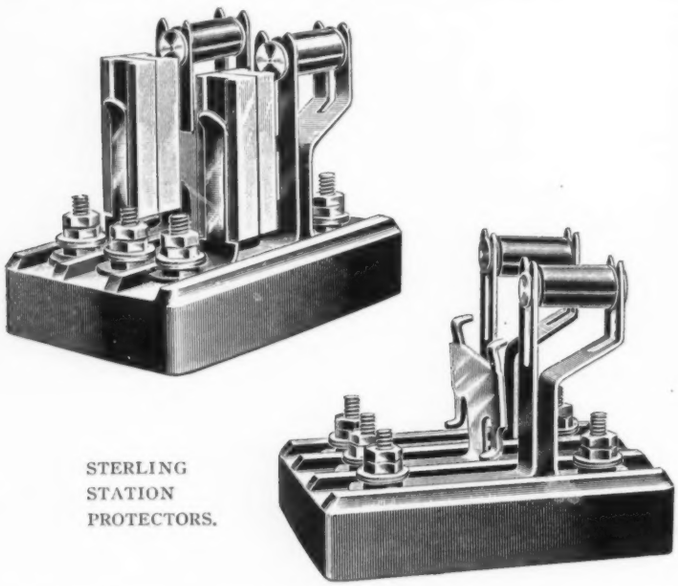
The switchboard is adapted for use of two or four selective signal party line work. In small boards the entire equipment is mounted within the cabinet, being wired out to connecting points ready for the attachment of the incoming lines. In large multiple boards the relays are mounted separate from the cabinet upon an iron relay rack. The board is very accessible, the front panel, the back panel and the top being removable.

Its operation is simple and positive. The calling subscriber energizes the relay which lights the lamp. The operator to answer the call plugs into the jack corresponding to the lighted lamp, which action extinguishes the light, putting up the connection wanted and ringing, which does not disturb the light of the called subscriber. Upon the subscriber completing the conversation and ringing off, it lights

the supervisory light in connection with the cord. Upon removal of the cords from the jacks the supervisory light is extinguished.

This switchboard is made up in 100 to 150 or 200 signals to the operator's position, and it is stated that 150 subscribers can be handled more rapidly and with more ease and give better service upon this type of board than 100 can upon the ordinary 100 drop magneto board. The board was designed as a compromise between the magneto exchange and common battery multiple exchange and is meeting with much favor. It appears to be something entirely new in the telephone field and deserving of the approbation and approval of the operating companies.

In the line of protection, in which line the Sterling Electric Company is a pioneer, it has made marked improvements. Its well-known tubular line fuses, which are mounted upon hard rubber blocks for the protection of cable and which are also mounted in connection with the carbon



STERLING STATION PROTECTORS.

plate arresters in hard rubber blocks for the protection of long lengths of cable, have been redesigned to such an extent that their mountings and spring connections are a decided improvement, are convenient and are acknowledged by the users to be among the very best forms of mounts and protection that have been offered.

They are also offering to telephone companies a compromise for the protection of individual stations or subscribers' instruments, one that conforms to the rules of the National Board of Fire Underwriters, one that is medium priced and within the reach of all telephone users; it is one that is a guaranteed protection against lightning, sneak and strong currents and consists of a heat coil and carbon plates mounted with German silver springs upon a porcelain block.

They are also offering another form of station protection, consisting of heat coils, mounted upon German silver springs and porcelain block. These two devices are only additions to their already large line of protective devices.

The popularity of the equipment manufactured by the Sterling Electric Company is evidenced by the constant increase in the number of users, the following facts giving some idea of its continuous growth:

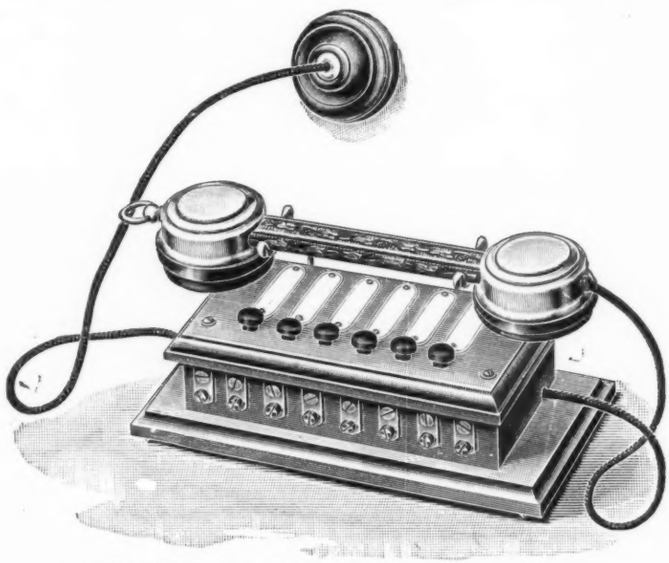
The company is building switchboards and additional switchboard equipment for Newark, Ohio; Francesville, Ind.; Janesville, Wis.; Waverly, Ohio; Flat Rock, Ill.; Brodhead, Wis.; Austinburg, Ohio; Newton, Ill.; Carson City, Mich., and is also furnishing its various types of combined cross connecting rack and protectors at Newark, Centerburg, Gambier and Wilkshire, Ohio; Baltimore, Md.; Sheboygan, Wis.; Danville, Ill.; Lebanon, Ind.; Cleveland, Ohio; Wayne, Neb.; Coshocton, Ohio; Donora, Pa.; Louisville, Ky.; Ardmore, I. T.; Portland, Me.; Dexter, Mich., and Wessington Springs, S. D. Besides the above the company has secured the contract to furnish the Standard Oil Company of Albany, N. Y., with one of its latest type of private branch switchboards.

The Sterling company is manufacturing a 5,000 capacity, 1,200-line multiple switchboard for the Home Telephone Company at Tiffin, Ohio. This board is to be their new type of lamp signal magneto switchboard and will be among the first lamp signal multiple switchboards installed in the United States.

The company has just received large orders for telephones from the following cities: Hudson, N. Y.; West Liberty, Iowa; Redkey, Ind.; Ossian, Ind., and Cedar Rapids, Iowa. The latter for their four-party line selective type of telephones. It is installing its latest type of combined distributing boards and protectors at Ames, Iowa; Caro, Mich., and Sully, Iowa; has contracted for a 500 tubular drop, bell type switchboards for Eaton, Ohio; has received orders for various switchboards and additions for Monticello, Ind.; Brandenburg, Ky.; Mattoon, Ill., and Galena, Kansas; has received large orders for various types of protectors for Kansas City, Mo.; Peru, Ind.; Pittsburg, Pa.; Hudson, N. Y., and Lyons, Iowa; is receiving large orders for various protector apparatus, especially its latest types, Nos. 250-A and 250-B, which a great many exchange managers have pronounced the finest made; has recently installed its four-party line systems in five of the largest cities in the west, the system having been selected after very severe tests; has just completed a four-position toll board for the United States Telephone Company to be used at Springfield, Ohio, and has also just installed a 3,000-line common battery multiple switchboard at Chillicothe, Ohio.

THE METAPHONE.

The Metaphone, a new type of intercommunicating telephone, is being manufactured by the Electric Utilities Company, Twenty-third street and Broadway, New York, and is meeting with a large sale. The accompanying illustration



METAPHONE INTERCOMMUNICATING DESK SET.

shows several types of Metaphones and Metaphone apparatus. This instrument was patented July 30, 1901, and has steadily grown in popularity from the day it was placed on the market.

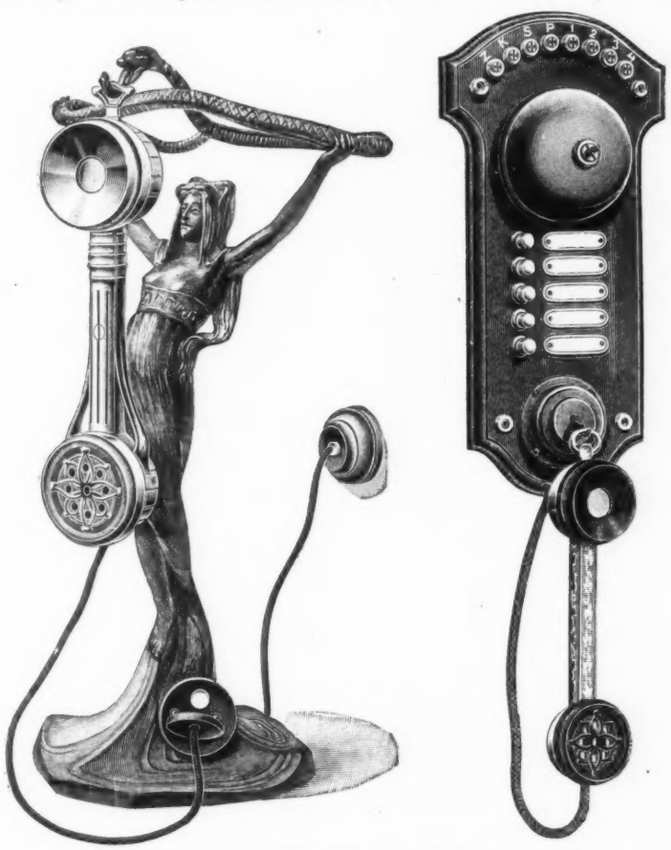
The Metaphone is primarily a telephone ready for attachment to any electric bell installation, and is designed par-

ticularly for use in houses, apartments, clubs, offices, hotels, factories, ships, etc. It enables persons in different rooms or departments to communicate with each other over the existing electric bell circuits, without any expense for special wiring or batteries. It is efficient and inexpensive, does not get out of order and can be connected up in a few minutes.

The Metaphone consists of a transmitter and receiver mounted on opposite ends of a short metal handle, the wires leading out from the transmitter end. One instrument, the push-button Metaphone, is to be attached to any push button at one end of a circuit; another, called the bell Metaphone, is to be attached to the bell (or bell and annunciator combined) at the other end of the circuit. No alteration is required to the push button, bell or annunciator.

The current necessary to operate the Metaphone is infinitesimal, so that any battery strong enough to operate the bell is sufficient for the Metaphone. For new installation the only wiring necessary is that used for an ordinary electric bell circuit.

The Metaphone intercommunication sets permit a number of stations to be so connected that from any one station direct telephone connection can be automatically established to any other station without the necessity of a central switchboard or switchboard operator. The connection is made by taking the Metaphone from the hook of the wall set (or the



FANCY METAPHONE HOLDER AND WALL SET.

cradle switch of the desk set) and depressing the button of the desired station. The call is made by several depressions of the calling button, which produces a sharp knocking sound in the Metaphone to which connection has been made. The speaker's mouth is not brought into contact with a mouthpiece, and, therefore, the Metaphone recommends itself both on sanitary and hygienic grounds. Conversation takes place by putting the receiver end of the Metaphone to the ear and talking past (not into) the transmitter, which is the end from which the wires read. The connection with the distant station is automatically broken at the end of a conversation by merely replacing the Metaphone on the hook. If, after talking to one station, one desires to talk to another, the button of the desired station is depressed, which makes the connection and at the same time automatically disconnects the station previously connected. At the end of each conversation, if the Metaphone is put in its proper place, the instrument is always ready to receive a call. Only one battery is used, hence the installation is much simpler and the battery maintenance much less than in systems which require a battery at each instrument.

The Electric Utilities Company in its catalogue makes the following claims for the Metaphone:

The Metaphone requires no alteration to the push button, bell or annunciator; requires no additional batteries; is made of metal and is decorative and durable; establishes immediate communication between distant stations; transmits sounds perfectly; saves waiting while the servant rung for passes through several rooms; saves delay in giving or receiving orders; saves steward's steps on shipboard; conducts sounds, but not smells, from the kitchen; facilitates isolation in the sick room; saves out-door trips in the country; is not affected by the vibration of the walls in factories; not being fixed to the wall, is not affected by the throb of engines on shipboard; is sanitary and hygienic; is mouthpiece and earpiece in one; is accessible to a giant or a dwarf; is light and handy; saves temper, time and trouble; saves servants.

Correspondence is invited and catalogue and price list will be sent upon application.

WOOD FIBRE CONDUIT FOR UNDERGROUND PURPOSES.

Engineers who have been engaged in the construction of underground conduit systems for the reception of cables of either high or low potential, as well as the engineers of the various companies now contemplating or planning the construction of underground systems, will be interested in the tests and experiments that have been made to determine the ability of a conduit manufactured of wood-pulp or wood fibre to withstand the various actions, chemical and other, that occur in an underground conduit system. Fibre conduit is by no means a new product, it having been first placed upon the market fully eleven years ago and having been in continual and growing use ever since.

In the progress of the manufacture of this style of conduit, wet wood pulp or fibre is wrapped, layer upon layer, upon a forming mandrel under heavy pressure until the desired thickness of wall is obtained; then, being taken off the mandrel, the wood pulp form is subjected to a drying process, after which it is placed in a vat of liquid compound which in itself is a preservative and an insulator. In the vat the conduit takes up approximately three times its own weight of the compound, which so thoroughly permeates the entire conduit structure that upon cutting into the wall of the finished duct a strong resemblance to hard rubber is noticed. After being thoroughly saturated in the insulating compound it is once more dried, and the length of conduit is then placed upon a lathe and both ends are automatically formed to constitute a screw joint or a socket joint, as may be desired. It is then ready for shipment and use. Not only is the wood fibre, or pulp, manufactured into straight lengths of conduit, but it is also used in producing ninety degree bends on a thirty-six or eighteen-inch radius, "S" bends, tees, crosses, elbows, couplings and two, three and four way junction boxes.

Fibre conduit is manufactured by The Fibre Conduit Company of Orangeburg, New York. The excellent properties of this material, first disclosed by laboratory tests, have been fully demonstrated also in its practical use for more than eleven years and in every variety of climate and local conditions.

A test made at the School of Mines, Columbia College, New York city, is reported as follows: "The conduit stood 10,000 volts alternating. When the static volt meter in secondary read 10,000 volts, the primary Cardew read 33.

The static voltmeter was then disconnected—10,000 being its limit—and the voltage further increased. When primary read 71 volts, a discharge took place through the air around the edge of the pipe, but not breaking it down. From these figures the breakdown voltage is higher than 25,000 volts alternating."

After testing this conduit for chemical qualities, H. T. Vulte, Ph. D., F. C. S., chemical and sanitary engineer, New York city, reported as follows: "I find that it is water-proof and will not be attacked by acids of alkalies; is not affected by moist earth, and should last indefinitely when laid underground. The screw joint is very perfect, and as the material is not subject to the expansion or contraction of iron, leakage is practically eliminated. It is a very good non-conductor, thus practically doing away with the troubles due to stray electrical currents. The conduit shows no deterioration from the action of gas, and I consider it an excellent article."

The following is a test made by the New York Edison Company, New York city: Twelve feet of conduit were coupled together and the following cables inserted: "Neutral," 150,000 C. M., "Positive" and "Negative," each 80,000 C. M. The switch was then closed. The amount of current flowing at first was about fifteen amperes and at the end of five minutes the current was increased to over 2,000 amperes. The "+" and "—" cables at the point where the short-circuit took place were fused off, and the conduit being a non-conductor, the current immediately ceased to flow and all combustion stopped. The conduit was then dug up, the cables removed and it was discovered that a hole 1½ inches in diameter was burned through the conduit and the inside charred for a distance of ten inches in each direction from the hole. Had such a short-circuit occurred under working conditions it would only have been necessary to replace about two feet of conduit where the short circuit took place, and the entire system would have been as good as ever.

The above test proved so satisfactory that the Edison company's engineers decided to make a more severe test as follows: The same size cables as used in the first were inserted in a similar section of the fibre conduit. One end of the pipe was plugged with cement, after which the conduit was filled with a saturated solution of salt water. The other end of the conduit being plugged, the whole section was buried in the ground to a depth of two feet. On closing the switch a current of fifteen amperes started to flow, the water was soon brought to a boiling point and the interior pressure was so great that one of the cement plugs was blown out. The water was kept at the boiling point for eleven minutes, at which time the current was rapidly increased to over 2,000 amperes and again fused the "+" and "—" wires. The conduit was then dug up, the cables withdrawn, and after a very close inspection no injury to the conduit could be discovered that would necessitate replacing any portion of it.

The uses of fibre conduit have been found to be many and varied. The most prominent roofers in the east have for some years been using the conduit as their main leads for carrying off water, etc. Vinegar manufacturers have found that this conduit used in replacing iron pipe for conveying their product from one part of their factories to another will last indefinitely, whereas, if iron pipe were used, it would soon be destroyed by the action of the acids or alkalies common in the manufacture of vinegar.

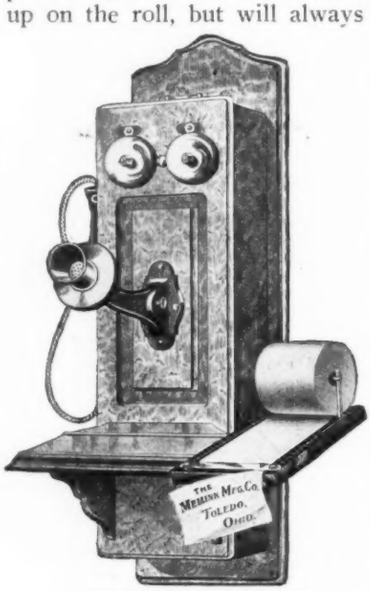
One of the most severe tests fibre conduit has been subjected to was in the factory of the Wood Products Company, at Binghampton, New York, where the three-inch screw joint type has been in service since 1900, being used as a run-off for still residium containing sulphuric acid and of a temperature ranging from 175 to 200 degrees Fahrenheit. After being in constant service for four years not the slightest deterioration can be detected. It has been shown by test and use that the fibre pipe is especially adapted for conveying water or other liquids such as dilute acids, alkali or corrosive salt solutions without deterioration.

The manufacturers of the wood fibre conduit assert that the electric light and power companies and telephone companies that have used their product are convinced as to the superior merit of the conduit and are constantly showing their opinion by duplicating their orders.

TELEPHONE BRACKET AND TELEPHONE PAD.

The telephone bracket and telephone pad, which are here illustrated, are manufactured by the Meilink Manufacturing Company, Toledo, Ohio, which concern is enjoying a large sale on these articles. The pad has an all-metal base and attaches to any telephone, no screws or bolts being used. It simply clamps over the telephone box by means of springs underneath the pad. The clamps, paper cutter and rods are nickel plated, while the pad is black japan, finished with gold line stripes — an ornamental as well as a very useful affair. The paper supplied is of a better quality than is usually supplied in an article of this kind. The pad has a wooden hub, a steel axle and will never tighten up on the roll, but will always work free. The width of the roll is standard, four and one-quarter inches. Roll paper can be bought in any stationery store. It is claimed for it that it is not alone the best but the cheapest telephone pad ever offered the public.

TELEPHONE BRACKET.



TELEPHONE PAD.

The desk telephone bracket is made in both double and single style. It attaches to any desk, at either end, and swings over the top of the writing bed. The best, most convenient and most practical arrangement known for telephone use is the company's claim for it. A pull brings it into position for use. A push swings it out of the way when through, without the speaker moving from his chair or disturbing the desk. It is a strong, substantial all steel bracket, made of steel plates two inches wide, and highly polished. The telephone sets on a swivel base, is perfectly rigid, and can be used in any position.

Such faith does the Meilink Company have in the merits of this bracket that it will ship same on approval, giving free trial. If not found satisfactory it may be returned at the company's expense.

The longest telephone circuit now in operation is said to be from Boston to Little Rock, Arkansas, a distance of nearly 2,000 miles.

AUTOMATIC SWITCHLESS INTERCOMMUNICATING TELEPHONE.

Owing to the large number of intercommunicating telephones which are being installed by exchanges throughout the United States, the Connecticut Telephone and Electric Company, Meriden, Connecticut, has brought out a new type, which is now being adopted to a large extent by exchange men. The working of this instrument is strictly automatic and is adapted for business houses, etc., which do not want to use a branch exchange switchboard. It is so arranged that connection with outside service can be obtained, and is one of the best types of an intercommunicating telephone. It is claimed for it that it is ideally built—simple in construction and absolutely positive in action. The cable connections are all made through the back of the instrument and are all mounted on hard rubber. It is not necessary to remove the telephone from the wall after it is once placed in position, as the connections and working parts are readily accessible when the cover is removed. The company has done away with cables crossing hinge joints, crowding of parts, etc.

The working of this instrument is as follows: The call is accomplished and connections automatically made by pressing down the button of the station wanted. When the receiver is returned to the hook after using, all connections are automatically restored. Any number of buttons may be pressed down at the same time, cutting in the various departments so that conversation can be carried on as if the speakers were sitting around a table. The company has combined in this instrument many new improvements, such as are used in modern telephony, all of which are covered by existing patents and other patents pending.

NEW STYLE CONDUIT ROD.

Since the original appearance of screw joint couplings many designs have been put on the market, very few of which have been successful. Several mechanical devices have been tried, but with little success. Experience develops that

the best coupling is the one jointed the easiest and quickest and which holds the rods firmly together without slack and without danger of separation in the duct, and which easily uncouples when removing.

Facing this combination of necessities, it is not surprising that many kinds of couplings have failed. But there is no demand in the above list, it is claimed, which is not satisfied with the coupling illustrated herewith.

The design is simple and not likely to get broken in a wagon or in a manhole. This is important, because the handling is severe. Made of iron, they are not negotiable at junk yards. The joint with the wood is made by rivets holding large washers; the wood, being hickory, does not split easily, and there is no chance for a break here.

Coupling and uncoupling is done very quickly, and when in the duct there is no slack between joints, nor can they possibly uncouple, although they will lend themselves to moderate bends. In weight they are light, and long runs can be easily handled by one man. The standard lengths are three and four feet, and special lengths are furnished.

The original price is much less than anything on the market, and the subsequent economies are also good, as is recognized by those who are familiar with the old and slow methods of rodding ducts and the new and quick way. These rods are easily handled in manholes, quickly jointed and unjointed, and will stand abuse. The couplings lock together rigidly, so rods will not buckle under pressure nor bind against conduit walls. There is no slack between rods.

This rod was designed and is being manufactured by the F. Bissell Company, Toledo, Ohio.

ANNOUNCEMENT.

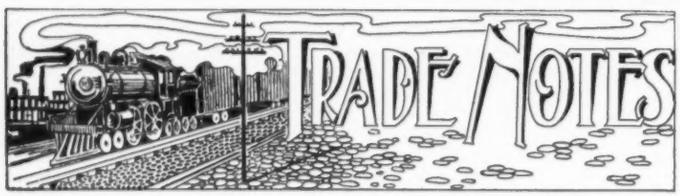
The recent decision of the United States Circuit Court of Appeals in sustaining the patent of the Western Telephone Manufacturing Company covering self-restoring switchboard drops has created a considerable amount of stir among manufacturers and users of telephone apparatus. It was to be expected that a variance of opinion would be shown. If all those making self-restoring drops were of the same mind on this subject with the owners of the patent, it is quite likely that only the latter would be making self-restoring drops. However, others differed in opinion and for nearly eight years have extensively manufactured them. The decision of the United States Circuit Court of Appeals is naturally satisfactory to the officials of the Western Telephone Manufacturing Company and unsatisfactory to others who have been adversely affected by it.

As a result, several patent attorneys, patent experts and manufacturers of self-restoring drop switchboards have submitted to interviews in attempts to minimize the effect of the decision, giving their opinions on the scope of the patent, history of the prior art and in some cases going so far as to intimate that the United States Circuit Court of Appeals decided the case wrongly. These patent attorneys, experts and manufacturers previously differed with the Western Company, alleging, not to say proclaiming, that the patent would not win. Since the decision, however, the difference between their opinions and those of the Western's officials is brought into clearer relief by the prime factor that the court agrees with the Western Company.

It can do no good to mislead the public. The patent attorneys not unnaturally want a difference of opinion; it makes business. Experts were born to differ. Manufacturers troubled by this decision have themselves to blame. Operators and other users will profit by the fallacies and errors of all three of these classes by using common sense and abiding by the decision of the court. It is not a theory, but a condition that is to be dealt with.

WESTERN TELEPHONE MANUFACTURING COMPANY.
Chicago, May 20, 1904.

Nothing shows the tendency of the times better than the development of the telephone service. There are now in use in the country upward of 3,500,000 telephone instruments, and a great majority of these have been installed since the Independent movement started. More than 300,000 telephones have been placed in farm houses during the past three years. The increase in farm telephones is proportionally greater than in any other branch.



THE METROPOLITAN ELECTRICAL SUPPLY COMPANY, Chicago, has removed its offices from 183 Lake street to 184 Lake street.

THE W. G. NAGEL ELECTRIC COMPANY, Toledo, Ohio, is distributing its new 904-page catalogue, which is one of the most complete that it has ever issued.

FRANK B. COOK, 140 Lake street, Chicago, has secured the license to the exclusive manufacture of all self-soldering heat coil and protective devices belonging to the Rolfe Electric Company.

THE FORT WAYNE ELECTRIC WORKS, Fort Wayne, Indiana, announces that it has opened an office at 69-75 New Montgomery street, San Francisco, California, in charge of F. V. T. Lee.

THE WESTERN TELEPHONE MANUFACTURING COMPANY, Chicago, has reprinted and is issuing to any one interested the decision in the self-restoring drop case, with its history and its consequences.

THE GERMICIDE TELEPHONE ATTACHMENT COMPANY, which was started at Arlington, California, a short time ago, is doing a large business in the manufacture of antiseptic telephone mouthpieces.

THE ELECTRIC APPLIANCE COMPANY, Chicago, will send information upon request relating to its new No. 36 X-P type telephone. The company calls it its "Extra Powerful" and claims that it is worth hearing about.

THE FISK-NEWHALL MANUFACTURING COMPANY, Chicago, is now established in its new quarters on South Jefferson street, occupying more than twice its former space, which speaks well for the success of the firm.

"A LITTLE TALK ON FARMERS' MUTUAL TELEPHONE COMPANIES—HOW AND WHEN TO ORGANIZE," is the title of a circular which is being distributed far and wide by the Farr Telephone and Construction Supply Company, Chicago.

THE STANDARD UNDERGROUND CABLE COMPANY, Pittsburg, announces the recent opening of a branch office in the Security Building, St. Louis, in charge of W. A. Caldwell, who was formerly connected with the Chicago office of the company.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, of 336 to 342 Ellicott Square, Buffalo, N. Y., has recently completed a magneto exchange for the Corfu Home Telephone Company, Corfu, New York, which is now in successful operation.

THE GARTON-DANIELS COMPANY, Keokuk, Iowa, has issued catalogue No. 40 of standard size, in which the features of the well-known Garton lightning arresters are clearly explained with the aid of handsomely executed half-tone engravings.

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Chicago and Rochester, N. Y., has contracted with the Mutual Telephone Company, Des Moines, Iowa, to equip its new exchange with instruments and apparatus throughout.

THE BULLOCK ELECTRIC MANUFACTURING COMPANY, Cincinnati, Ohio, in its May calendar of great men of science and engineering, publishes a fine portrait of Charles Proteus Steinmetz, and on the back of the calendar is the usual biography.

THE EMERSON ELECTRIC MANUFACTURING COMPANY, St. Louis, Mo., publisher of *The Emerson Monthly*, has issued the May number. This publication contains many interesting articles and illustrations, a copy of which will be sent on request.

THE STANLEY ELECTRIC MANUFACTURING COMPANY, Pittsfield, Massachusetts, in bulletin No. 139 describes the "S. K. C." high-voltage oil switches. The bulletin is illustrated with oil switches of 15,000 volts, 60,000 volts, 6,600 volts and 3,500 volts.

THE KUHLMAN ELECTRIC COMPANY, Elkhart, Indiana, is sending out a neat aluminum card, on one side of which is given, "in a nutshell," the weights, area and safe current capacity of the various sizes of insulated wire. A brisk demand for the company's three-phase transformers is reported.

THE STANDARD TELEPHONE AND ELECTRIC COMPANY, Milwaukee, since it has become established in its new offices and factory in the Cream City, is flooded with orders, and even with its largely increased facilities is behind in its shipments. The growing demand for the Standard goods is the best proof of their excellence.

THE FISK-NEWHALL TELEPHONE MANUFACTURING COMPANY, Chicago, is putting out a nicely illustrated condensed catalogue of its celebrated "FI-NE" telephones, switchboards and generators. It is also distributing a mailing circular on "The Heart of the Telephone." Catalogue and circular will be sent on application.

THE AMERICAN STEEL AND IRON COMPANY, with offices in all the large cities, has issued a catalogue describing its manufacture of wire ropes and cables, together with fittings. The catalogue deals very extensively with all the different styles of wire ropes, and has besides an exhaustive treatise on strains, splicing and power transmission.

COPPER GOSSIP for May gives much valuable information on the subject of copper, and should be in the hands of exchange managers and all those interested. It is published by the National Conduit and Cable Company, 41 Park Row, New York city, and those who are not now receiving the publication should write and have it sent to them.

THE ERICSSON TELEPHONE COMPANY, New York city, has issued a neat little pamphlet entitled, "At Your Service," descriptive of the various styles of switchboards which it manufactures. The pamphlet is artistically illustrated, giving views of some of the chief American and European central offices that the Ericsson Company has built.

"YOURS TRULY," GEORGE W. CONOVER, Chicago, telephone purchasing agent, is handing out to the trade a neat little blotter, the chief feature of which is a fine half-tone cut of the genial G. W., whose handsome face looms up like an ocean liner on a clear day. The only criticism we have is that one can't tell from the blotter whether Conover is running for alderman in the sixth ward, is a candidate for pres-

ident on the prohibition ticket, or is just in the telephone business.

THE AMERICAN STEEL AND WIRE COMPANY, Chicago, is sending out a carefully prepared catalogue on "Wire Rope and Fittings." Wire ropes for almost every purpose are listed; also wire-rope fittings, such as hooks and sockets, hooks and thimbles, etc. A clear description of how to splice a wire cable is one of the useful things in the book.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, reports a constantly increasing demand for its long distance bridging toll line and country party line telephones for four-party selective signaling systems. The "International" bridging instrument is said to be, mechanically as well as electrically, one of the very best instruments of its kind.

THE NORTHERN ELECTRIC COMPANY has filed articles of association in the office of the Secretary of State at Burlington, Vermont, and on May 2 opened headquarters in that city. The company is composed of Burlington and Boston capitalists, and will do a general electrical contract business, paying special attention to furnishing supplies to Independent telephone companies.

THE CENTRAL ELECTRIC COMPANY, Chicago, is mailing to the trade catalogue and price list No. 21, in which are listed telephones and construction material. This is an attractive book, and contains the latest goods and prices which are of interest to the telephone trade. Any company which has not received a copy of this book will be favored with one by writing to the company.

THE S. H. COUCH COMPANY, Boston, reports heavy sales on its "Workwell" telephone. This set fills a long felt want, being a thoroughly reliable battery call telephone at a low price. These telephones retail at $7.50 per pair. Dealers are given a liberal discount. The above company has prepared an interesting circular on the same and will gladly mail it to anyone interested.

THE FAHNESTOCK TRANSMITTER COMPANY, New York city, which manufactures the Universal microphone and patent spring binding post, has removed from 74 Cortlandt street, New York city, to 132 Havemeyer street, Brooklyn, where it has opened up more pretentious headquarters. This firm reports a rapidly increasing business and an unprecedented demand for its goods.

THE MONARCH ELECTRIC AND WIRE COMPANY, Chicago, is placing on the market a clever conceit in the form of a pneumatic telephone receiver cushion, for which it has the exclusive agency. It is a rubber arrangement made to fit any receiver, and when in position forms a soft cushion for the ear, makes hearing easy and turns the act of telephoning into a pleasure. Prices on application.

THE DUNCAN ELECTRIC MANUFACTURING COMPANY, La Fayette, Ind., will be pleased to send a copy of its latest bulletin, describing the Duncan integrating wattmeter for direct currents. This bulletin, in addition to describing the wattmeter in detail and giving price lists and other information, contains a number of half-tone illustrations showing the various functions of the instrument.

THE AMERICAN STEEL AND WIRE COMPANY, Chicago and New York city, has issued a new catalogue descriptive of its wire rope and fittings. In addition to the illustrations and quotations on wire rope of various dimensions and for various classes of service, there is much interesting matter in the form of directions for splicing rope and miscellaneous wire tables. The company also manufactures every required form of wire rope fittings in the shape of hooks and thimbles, etc.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, is installing 4,000 automatic telephones and complete switching equipment for the Home Telephone Company of Los Angeles, Cal., and 1,200 for the Auburn Telephone Company, Auburn, N. Y. It has also received orders for the equipment of San Diego, California, with 1,200 automatic telephones, and Lewiston, Maine, with 1,500.

JONES AND WINTER, telephone engineers and contractors, Monadnock Building, Chicago, recently installed a telephone plant at Gainesville, Texas. The equipment is of the Sterling make, full central energy. The switchboard now accommodates 750 subscribers and has an ultimate capacity of 2,200 lines. C. B. Luck was superintendent of the company at this installation and J. R. Deeves foreman.

THE COLUMBIA ELECTRIC COMPANY, McCordsville, Indiana, is offering a new self-contained switchboard drop, which, it is said, is having a wide sale. The drop is so built that it is interchangeable with switchboard drops of certain other makes. The Columbia desk set is also made by the concern, and is a very neat, well-appearing instrument, built along the severe lines that are now so popular.

THE AMERICAN CARBON & BATTERY COMPANY, St. Louis, manufacturers of carbons, electric porcelain, 2-inch cells and discs adapted for telephone purposes, has a fine exhibit at the St. Louis World's Fair, in the department of electricity. The company is distributing gratis to its customers and all dealers in carbon and electric porcelain a handsome souvenir paper weight made of combination carbon and porcelain.

SMITH'S MARLIN CABLE HANGERS, manufactured by Milton M. Smith, Evanston, Illinois, consist of a hook, uniform in size and shape, fastened to a marlin cut to accurate length and knotted by machine. These hangers are put up fifty in a bunch of uniform size. The size is marked on each package for the convenience of construction men. The product is handled by the John A. Roebling's Sons Company.

THE GEMMILL TELEPHONE & MANUFACTURING COMPANY, Cleveland, Ohio, is placing on the market a new telephone ringer, for the adjustment of which no tools are necessary. Knurled thumb screws are provided, by means of which the magnet cores may be moved to and from the armature. The armature itself is shaped peculiarly, which is said by the makers to increase the good qualities of the ringer.

THE INTERNATIONAL TELEPHONE MANUFACTURING COMPANY, Chicago, announces that the Bowling Green Telephone Company, Bowling Green, Missouri, has recently completely re-equipped its central office apparatus and enlarged the exchange to meet its rapidly growing business. It installed a 400-line "International" self-restoring drop switchboard and "International" telephones for the increase in the plant.

THE EWING-MERKLE ELECTRIC COMPANY, St. Louis, has issued an illuminated and indexed map of the World's Fair Grounds and The Pike, which is marvelous in its completeness and convenience. It is 8x12 inches in size and folds up into a neat envelope, so that it can be easily carried in the vest pocket. It shows the location of every building and every feature on the grounds, and the index enables one to find instantly the location sought. A copy will be given

free to anyone who applies for it, either personally or by mail.

FRANK BYLER, West Chester, Pa., is the manufacturer of a pole raising derrick which is doing some good for Independent telephone companies. During the recent installation of the Conestoga Telephone Company's lines from Joanna to Hick Creek Valley, White Bear and Geigertown, Pa., all the poles were set by the aid of Mr. Byler's derrick. An average of about fifty poles per day were hoisted and set in the holes.

THE MONARCH ELECTRIC MANUFACTURING COMPANY, Warren, Ohio, has decided to increase the capital stock of the company from $10,000 to $50,000. The rapidly growing business of the company requires larger capitalization in order that it may be more properly carried on. The outlook for the fall trade is stated to be very good and the plant will be operated throughout the summer so as to be able to meet the demand for the company's products.

THE WILLIAMS TELEPHONE AND SUPPLY COMPANY, Cleveland, Ohio, has issued a neat little booklet extolling the merits of the Williams telephone through the medium of scores of testimonials, all of which unite in praising the product of this concern. A beautifully illustrated catalogue, which has a most artistic and highly embellished cover, describes in full the Williams telephones and other apparatus, giving prices. Either booklet or catalogue will be sent upon application.

THE ACME ELECTRIC COMPANY, Chicago, has just issued a handsome illustrated catalogue descriptive of the wide variety of goods it manufactures—switchboards, telephones, generators, transmitters and appliances. The cover is embellished in gold and brown and is very attractive. The company reports a largely increased business this season, and is sparing no efforts to still further enlarge its trade. Correspondence is invited, and catalogue and prices will be sent on application.

THE ROEBLING CONSTRUCTION COMPANY, Trenton, N. J., has gotten up a souvenir of the Baltimore and Iroquois theater fires. The book is profusely illustrated, and shows in a vivid manner the ravages of the fire upon the so-called fireproof buildings. In all there are thirty-one full page engravings, illustrating some of the largest office buildings before and after the fire. The findings of the court of inquiry of the Iroquois theater fire are given in full, together with some suggestions for prevention of similar catastrophes.

THE C. A. MANUFACTURING COMPANY, Austin, Texas, has issued a circular advertising its well-known "C. A. Wood Preserver." It is illustrated by sections of pine and oak ties and poles, which after having been coated with the "Preserver" and left in the ground eight years, were found, upon being dug up, in practically perfect condition. A picture of a half-rotted tie, dug up after eight years, and which was not treated, is a strong argument in favor of the "Preserver." A number of complimentary facsimile testimonials are printed also. The circular should be a business bringer.

THE FARR TELEPHONE AND CONSTRUCTION SUPPLY COMPANY, Chicago, is distributing a neat circular (No. 2) descriptive of the goods which it manufactures—telephones, switchboards, insulators, supplies and tools, transmitters, magneto bells, etc.—and illustrated by a profusion of halftone cuts. A price list is also attached. Circular and price list will be mailed on application, and the Farr Company invites correspondence from prospective buyers. It reports a large influx of orders this spring and a rapidly increasing business.

THE CHICAGO WRITING MACHINE COMPANY, Chicago, announces that among the latest automatic exchanges to adopt its toggle arm principle in connection with the desk set is the Citizens' Telephone Company of Grand Rapids, Michigan. These arms practically make the automatic desk set as economical as the Adjustaphone. The Chicago Writing Machine Company, 105 Wendell street, which manufactures the Adjustaphone, and which furnishes the toggle arms for the automatic desk sets, reports a steadily increasing volume of business.

THE TELEPHONE HYGIENIC COMPANY, Cleveland, Ohio, is placing upon the market its new telephone hygienic guard —a clever device which offers a clean surface of antiseptic paper, chemically pure, to the lips every time telephone conversation is desired. The paper is wound from one spool to another by means of a thumb screw, and is changed with every operation. It is fixed in a very light steel framework, which is readily attached to all standard telephones and which does not disfigure the instruments. Paper and appliance scarcely weigh one ounce.

THE AMERICAN PUSH-BUTTON TELEPHONE COMPANY, New York city, announces that it has been authorized by the court to change its legal name to Anders Push-Button Telephone Company, which change went into effect May 7. It is sending out a little catalogue illustrating, describing and listing its push-button telephones, together with a leaflet containing specifications of "Anders" push-button telephone and parts and two leaflets containing diagrams and instructions for connecting up the telephone. Both of these leaflets and the catalogue will be sent on request.

THE WARD-LEONARD ELECTRIC COMPANY, Bronxville, N. Y., has just issued a new catalogue, No. 19,038, covering its enameled resistance units. On account of the increasing demand for new sizes of this resistance unit, it has catalogued three new sizes. One is a tube two inches long and 7-16 inch diameter, upon which in extreme cases can be placed 5,000 ohms resistance. Another is a tube four inches long by 7-16 inch diameter upon which can be placed 11,000 ohms. The SS type covers a tube suitable for small rheostats, as it is divided into eight steps. Copies of the bulletin can be had on application.

THE CONNECTICUT TELEPHONE AND ELECTRIC COMPANY, Meriden, Connecticut, has placed upon the market a new type of automatic switchless inter-communicating telephone, designed for public buildings, factories, etc. This type is now being adopted a great deal by exchanges and a complete bulletin has been issued describing the same, which will be sent on request. This type is strictly automatic in its working and is a most reliable type of telephone for interior service. The company reports a heavy demand for this type and has issued some special prices for the exchanges, which will be sent on application.

THE MCROY CLAY WORKS, BRAZIL, Indiana, and Chicago, has issued a 50-page booklet under the title, "Voices of the Past." It gives a history of the banquet and reception tendered to Professor Elisha Gray, the inventor of the telephone, by the citizens of Highland Park, Illinois, November 15, 1878. It touches upon every feature of the famous historical event and will be read with interest by telephone men in general. It is also valuable as a souvenir. The frontispiece is a fine steel engraving of Dr. Gray, which, in itself, is a work of art. A written request will bring the

booklet. It is something that should be in the hands of every telephone man in the United States, as its value will increase as the years go by.

THE CENTRAL TELEPHONE & ELECTRIC COMPANY, St. Louis, is putting out, in connection with its well-known Becker protectors and terminals, a fuse which does away with the necessity of a carbon block. The "Gilgen Patent Fuse," used in No. 10 and No. 12 fuse blocks, is so constructed as to give six inches of fuse and eight saw teeth points within one-thirty-second inch of ground plate, giving all the advantages possessed by carbon arresters without the disadvantage of continual attention to prevent grounding lines. Fuse is also made of special metal, always retaining same ampere capacity, and acts as a highly efficient sneak current or lightning protector.

THE CENTRAL ELECTRIC COMPANY, Chicago, is distrib uting a mailing circular of peculiar and timely interest, which combines, in addition to a splendid map in colors, a quantity of information concerning the status in the Russo-Japanese situation. The advertising text is characteristic, and the following is worth quoting: "While the war in the Far East is attracting so much attention, we are engaged in a most vigorous campaign after business. With such aids as Okonite and I. X. L. wires, Okonite tape and Manson tape, Pittsburg transformers, Columbia lamps, D. & W. material, and Williams-Abbott telephones, backed by ample facilities and every modern system to insure proper and prompt handling of business, we hope to capture your orders."

THE BENEDICT & BURNHAM BRASS AND COPPER COMPANY, Chicago, is bringing to the notice of telephone companies in general the "H W W" wire connector, a novel, though simple, form of connector for making joints in telephone wires at points where it is desired to open the circuit for testing or other purposes. The unique feature of this connector consists in each plate having two cylindrical grooves of different depths, accurately formed to fit two wires of different diameters, such as No. 12 and No. 14, when the grooves of similar depths are opposite. When one plate is turned around the single bolt, so that a deep groove in one plate is opposed to a shallow groove in the other, two wires of the same diameter, as two No. 14 or two No. 12, can be connected, and at all times the bolt will have firm bearing upon the wires and make a good contact.

THE CENTURY TELEPHONE CONSTRUCTION COMPANY, Buffalo, New York, has recently brought out a new automatic switchboard signal. The signal has, aside from many excellent constructional features, the special advantages of being adaptable to either common battery or magneto systems. The switchboard, for which this signal was designed, when used on magneto systems, increases the efficiency and reduces the cost of operation and maintenance. By adding a condenser in the ringing circuit of each telephone this system is changed into automatic calling, making it equal in operation to a common battery system. By replacing the magneto with common battery telephones, and making slight alterations in the signal connections the system is changed to complete common battery. The company will be pleased to furnish any further information upon request.

LEROY W. STANTON, consulting and constructing engineer, Cleveland, Ohio, has issued a handsome illustrated pamphlet, printed on enamel paper, which has for its title, "The Dawn of a New Era in the Telephone World," and which is devoted to exploiting the open-wireless or all-cable telephone plant. Mr. Stanton is strongly in favor of this style of telephone construction, and he has successfully installed a number of large systems of this sort. The principal illustrations show sections of the all-cable plants at Austin, Minnesota; La Crosse, Wisconsin; Bellefontaine, Ohio, and Norwalk, Ohio. A number of testimonials complimenting Mr. Stanton's ability as an engineer are published also. It is claimed for the open-wireless system that by its use the net earnings of telephone properties can be increased more than 100 per cent. Mr. Stanton has recently opened a branch office in the Monadnock Building, Chicago. He will be pleased to furnish a copy of the pamphlet to any who desire it.

THE SWEDISH-AMERICAN TELEPHONE COMPANY has recently closed contracts with the following named telephone organizations, respectively, for their complete equipment: Miller City Farmers' Mutual Telephone Company, Miller City, Ohio; Mead and Reater Telephone Company, Calumet, Iowa; Minneiska Telephone Company, Clearwater, Kansas; Grant County Telephone Company, Silver City, New Mexico; Wayne Independent Telephone Company, Wayne, Nebraska; Leona Mutual Telephone Company, Leona, Kansas; Jetmore Telephone Company, Jetmore, Kansas; Farmers' Telephone Company, Bushong, Kansas; Cutler Co-Operative Telephone Company, Cutler, Indiana; Majenica Telephone Company, Majenica, Indiana; Cambria Telephone Company, Cambria, Wisconsin; Farmers' Mutual Telephone Company, Navarie, Kansas; Jamestown Telephone Company, Jamestown, Kansas; De Queen Telephone Company, De Queen, Arkansas; Snickersville Telephone Exchange, Bluemont, West Virginia; Farmers' and Merchants' Telephone Company, Monroe City, Missouri.

THE HOLTZER-CABOT ELECTRIC COMPANY, Boston and Chicago, is distributing a souvenir match safe, which is just about the cutest, cleverest thing of its sort ever put in circulation. It is made of two layers of thin leather, stained green, in the shape of a frog, and to make it still more realistic it is stamped on top and bottom to represent legs, eyes, skin, etc. It is very aptly called "The First Frog of Spring," and it is claimed for the imitation amphibian that, if carried in the vest pocket, it will prove a mascot and cure corns, dandruff, indigestion, warts, loss of appetite and spring halt. Inside of Mr. Frog is a spring, and by pressing across the gills the mouth is made to open and a dozen matches may be slipped into his little insides. With a slight stretch of imagination one can almost hear his froglets croak, and by steadily gazing at the counterfeit denizen of the millpond for two minutes and thirty-six seconds by the watch one can easily drift into a state where it is no trick at all to smell frog's legs frying for dinner. At this point turn the little fellow back up in your hand, strike your match and "smoke up."

THE STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY, Rochester, N. Y., and Chicago, is distributing a most interesting little booklet, entitled, "How Successful Telephone Systems Have Been Organized," the aim of the publication being "to furnish suggestions in regard to the construction of telephone lines and systems to parties interested in the telephone subject." Included in the booklet are flattering testimonials from officials of a score or more of Independent companies in different parts of the country, who have used the Stromberg-Carlson telephones and other apparatus with unvarying success and who have only words of praise for the goods manufactured by this concern. Over a dozen pages of the booklet are given over entirely to forms for corporation papers, constitutions, by-laws, telephone contracts, etc., to be employed in the organization of Independent exchange companies. A strong argument in favor of incorporation is presented also. The little work is not only timely and its publication an enterprising business

stroke, but it is invaluable to all those interested in telephone exchanges, and more particularly to parties who are planning the organization of Independent companies. It will be sent upon request.

THE FIBRE CONDUIT COMPANY, Orangeburg, New York, reports that between April 1, 1903, and April 1, 1904, the number of orders received showed an increase of nearly 300 per cent, and the month of April, 1904, proved to be the largest April in the history of the company. Orders received during that month included those from the Electrical Commission, Baltimore, Md.; Edison Electric Illuminating Company, Brooklyn, N. Y.; General Electric Company; Merchants' Heat and Light Company, Indianapolis, Ind.; Cazenovia Light and Power Company, Cazenovia, N. Y.; Westinghouse Electric & Manufacturing Company; Suffolk Light, Heat and Power Company, Southampton, N. Y.; United States Naval Academy, Annapolis, Md.; Edison Electric Illuminating Company, Detroit, Mich.; Morton F. Plant, Groton, Conn.; Citizens' Telephone Company, Grand Rapids, Mich.; Edison Electric Illuminating Company, Boston, Mass.; Public Service Corporation, New Brunswick, N. J.; W. M. Sheehan & Company, New York city; Telluride Power Company, Provo, Utah. The Telluride Power Company at Provo, Utah, is building an underground conduit system for its 60,000-volt circuits and sent its representative east to investigate the different types of conduit, with the result that their entire order was placed with The Fibre Conduit Company, as they found, after thorough investigation, that the Fibre Conduit, as manufactured at Orangeburg, was the only type of underground conduit that would meet their requirements. The Electrical Commission in Baltimore has used approximately half a million feet of Fibre Conduit.

THE CANDEE PATENTED POTHEAD.

There is nothing new in the idea of the pothead, but up to this time the greater proportion of potheads in use are those made on the job. In many cases the maker is hurried in his work, or has not the right sort of tools or material at his disposal, and as a consequence, the pothead has not infrequently become a source of annoyance and loss.

The Central Electric Company, Chicago, as General Western Agents for the Okonite Company, Ltd., is selling large numbers of the Candee Patented Pothead, which greatly simplifies and bids fair to revolutionize old methods.

The Candee Patented Pothead has been manufactured by the Okonite Company, Ltd., for many years and consists of a short piece of lead sheath of the same size as that of the cable, to which it is to be attached. From one end of this sheath extend about two feet of braided and paraffined wires in ten to 150 pair, as may be required. From the other end of the sheath project a like number of Okonite rubber covered wires, from thirty to eighty-four inches long, for fanning out in pole house or office terminal. The distinctive feature of the pothead is that these wires are continuous; one half of each wire being rubber covered and the other braided and paraffined. Special machinery and tools are employed in manufacturing the pothead, and it is securely sealed with Okonite insulation, thus making it entirely water and moisture proof. Over one end of the pothead, and entirely covering the paraffined wire is an outer lead sleeve which is temporarily soldered to the pothead to protect the wire.

To attach this pothead to the cable, it is only necessary to unsolder the outer sleeves, slip it back and connect the wires from the pothead with those of the cable in the usual manner; then slide the outer sleeve back so that one end extends over the sheath of the cable, and the other over the pothead itself. Now by wiping a joint at each end of the sleeve, you have a pothead which is neat in appearance, absolutely moisture proof, and the pothead has been made in less than one-half the time.

This pothead is made in 19, 20 and 22 B. & S. gauge, is extensively used by the largest telephone companies in the field, and the economies which it effects insure a constantly increasing demand. The Central Electric Company is enthusiastic over the outlook, and states that the number of orders so far received have been far beyond its expectations.

"READY" TELEPHONE MEMORANDUM PAD HOLDER.

The W. G. Nagel Electric Company of Toledo has recently put on the market a very useful article in its "ready" telephone pad holder, which we illustrate herewith. This holder can be fastened to the wall or telephone as desired, and one of its advantages over former devices of this nature is that ordinary scrap paper can be used as readily as pad paper. Each holder holds the paper against a

"READY" TELEPHONE PAD IN USE.

straight edge by means of a spring underneath the upper board, the straight edge answering the purpose of tearing off "memos" taken while at the telephone. For stores and offices this pad holder is almost indispensable, as by its use there will always be pad paper for taking down "memos" or orders received over the telephone.

JOINT EXHIBIT AT THE WORLD'S FAIR.

The Standard Underground Cable Company, Pittsburg, and the McRoy Clay Works, Brazil, Indiana, have a joint exhibit at the St. Louis World's Fair in Section 3, immediately adjoining the northwest entrance of the Electricity building. The exhibit shows a cross-section of an actual conduit consisting of seventy-two ducts, with a manhole at either end, one manhole being complete with a cover, the other being open. A trench seven feet deep and five feet wide extends the entire length of this conduit, enabling close inspection of the method of laying conduits, including the wrapping, concrete base and top, and the general construction of the manholes, showing hangers, pipes to poles, etc.

At one end in the manhole is shown a capstan rigged up for drawing in cables and connected to a cable which is mounted on a reel at the other manhole; the cable being drawn through the ducts and part of the ducts being split, so as to show the method of fastening cables to rope, etc.

From the manholes, cables go to distributing poles, showing the method of distribution to aerial cables for telephone, electric light and street railway work, with various terminals used to protect the ends of the cable in such work.

The McRoy Clay Works shows piles of clay as it is dug from the ground and the various processes through which the material goes to produce the finished duct.

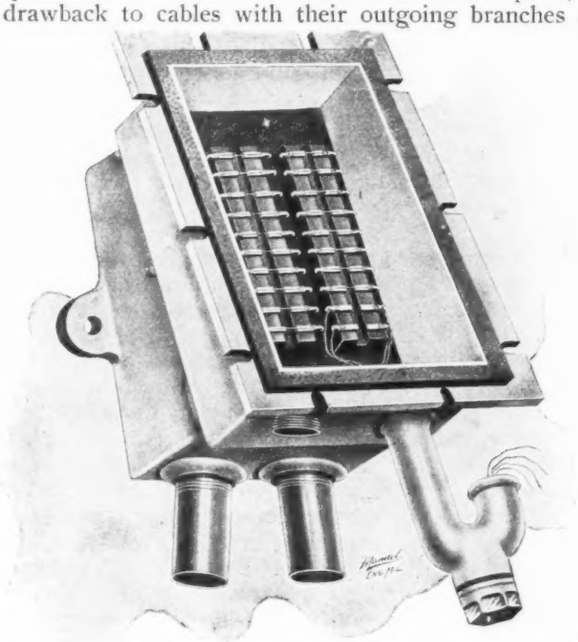
The Standard Underground Cable Company shows samples in handsome cases of all the various cables and appliances made by them. An examination of this system will show, in very complete detail, the method of installing conduits and drawing cables into completed conduits.

ANDRAE UNDERGROUND DISTRIBUTION BOX.

The accompanying illustration shows the Andrae O. K. underground distribution box, manufactured by the Julius Andrae & Sons Company, Milwaukee, and which is in successful use in many cities and towns throughout the country.

Time and practice have demonstrated beyond a doubt that the underground electric system, with its clay conduits through which leaded electric cables run is perfectly safe and economical and a necessity for quick transaction of business by telephone, or for public security in connection with fire and police protection.

Experience has shown that when in need of repairs, the one drawback to cables with their outgoing branches and



ANDRAE O. K. UNDERGROUND DISTRIBUTION BOX.

junctions is the necessity of cutting the lead covering of cable wires, which must be partly pulled out and scraped before any testing can be done, or extra connections added. This is slow and tedious work—unelectrical and unmechanical and a patched-up-job afterward. With the Andrae O. K. box the electrician does all the work and no plumber is needed to make the air-tight lead joint.

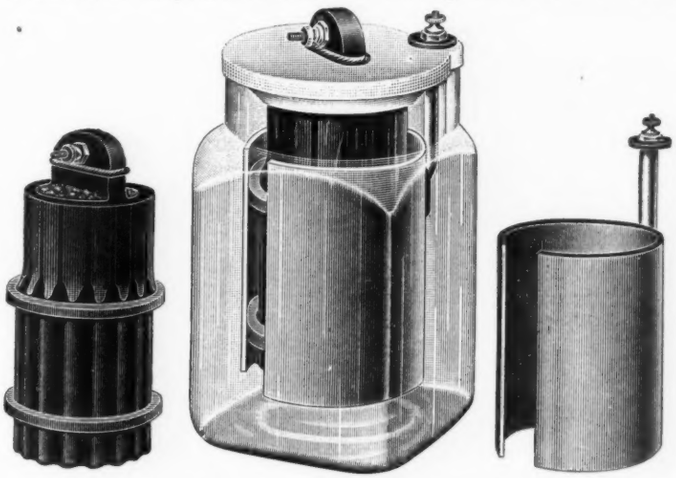
Expediency of repair in case of a ground, high resistance, escapes or loose connections is accomplished with an Andrae O. K. distribution box, while extensions to system can be made without disturbing same. The best fire and police alarm system is the one which protects the city. That is what the box is for exclusively. It is moisture and waterproof and makes short work of trouble.

Adaptability to general conditions is claimed for the Andrae box in particular. The cost of installation of cables is reduced, and after the lead cable has once been soldered to the brass nipple, it never becomes again necessary.

The main points of superiority claimed for the Andrae O. K. box are economy, accessibility, safety and durability. It acts as a switchboard, testing board and junction box, all in one. The illustration represents a patented junction box. It is of cast metal and the front has a removable cover with brass bolts and screw connections, and is provided with a rubber gasket to keep out moisture. The fact that it has been in continuous use for ten years attests to its merits. For further information and prices, write to Julius Andrae & Sons Company, 225 West Water street, Milwaukee, Wisconsin.

AMERICAN CARBON & BATTERY COMPANY.

The American Carbon & Battery Company, St. Louis, commenced business in 1901, succeeding the Booker Carbon Company. The company, in addition to manufacturing carbon and all its auxiliary lines, also manufactures electric porcelain, and the business has increased to such an extent that it has become necessary for the company to seek a new location, as its present location is inadequate to admit of the



NEW PHOENIX BATTERY AND PARTS.

placing of machinery sufficient to keep pace with the business. The company is now negotiating for a large tract of ground in East St. Louis, Illinois, and will commence the erection of a building early in the fall, and it is the intention of the company to erect a modern plant, using the latest improved machinery and kilns for the manufacture and burning of carbon and porcelain.

The company makes telephone specialties one of its main features, has given this line close attention and is pleased to state that it has been liberally rewarded for its attention to this branch of the business by increased orders. In addition to telephone specialties, the company manufactures the "New Phoenix" improved open circuit circular zinc cell, which is specially adapted for telephone purposes, and a cut of which is here shown. The "New Phoenix Cell" was designed by the company, is very simple in construction and can be renewed with ease, as it does not require any mechanical skill for renewing, and the construction of the carbon cylinder, with the carbon electrode in the center passing directly through the depolarizer, enables the depolarizer to perform its functions and give to the cell quick recuperative powers, as well as an increased amperage.

The company also manufactures discs, both polished and unpolished, and is now receiving orders for discs from telephone companies which were previously compelled to make their purchases in foreign countries, owing to the fact that they were unable to get a satisfactory disc made in this country.

The officers of the company are: Henry Wrape, president; C. T. Clark, general manager.

Telephone Tales Tersely Told

The Home Telephone Company of Kansas City is building a line to St. Louis.

The city of Wheaton, Minnesota, has voted to install a municipal telephone exchange.

Telephone extension will be quite general throughout North Dakota this spring and summer.

The stockholders of the Stewart Telephone Company in Georgia have declared a dividend of 25 per cent.

The Kinloch Long Distance Telephone Company of Jefferson City, Missouri, will increase its capital from $300,000 to $5,000,000.

The Maryland legislature has chartered the Southern Maryland Telephone Company and the company has organized for business.

The Independent Telephone Company at Coshocton, Ohio, will issue $22,000 preferred stock to improve and enlarge its exchange.

The Garland (Texas) Telephone Company and toll lines, formerly owned by T. S. Walker, have been sold to Edward A. Smith for $3,400.

The city council of El Paso, Texas, has granted a telephone franchise to R. V. Bowden for the Southern Independent Telephone Company.

A franchise for a telephone exchange at Wimbledon, North Dakota, has been granted to J. A. Peterson, and work has been started on the system.

The Edgerton (Wis.) Telephone Company has commenced stringing aerial cable to reduce the congested condition of the main lines in town.

The Home Telephone Company of Ventura, California, has secured nearly 1,000 contracts in Santa Barbara, and has already installed 750 telephones.

The Utica (N. Y.) Telephone Company now has 2,700 telephones in service. This company began operations April 1, 1903, with 1,300 subscribers.

The manager of the Home Telephone Company of Fort Wayne, Indiana, states that the company is installing new telephones at the rate of 100 a month.

The Citizens' Telephone Company of Lansing, Michigan, contemplates making important extensions and improvements in its system during the summer.

The Home Telephone Company of South Bend, Indiana, is preparing to extend lines to Miles, Galion, River Park, Buchanan and other towns in that section.

Asheville, North Carolina, is up in arms over the miserable service and high rates inflicted upon the community by the Southern Bell Telephone Company. The board of trade and the city council are acting in the matter and it is expected that drastic action will be taken, as a committee has been appointed to investigate.

The Citizens' Telephone Company of Terre Haute, Indiana, is preparing to install 32,000 feet of new cable and make additional improvements at a cost of $26,000.

The Madelia (O.) Telephone Company, which has been in operation only six months, has declared a dividend of six per cent and set aside three per cent as a reserve fund.

Work has been commenced at Peoria, Illinois, on the handsome new exchange building to be occupied by the Interstate Independent Telephone and Telegraph Company.

Dr. W. B. Scott of Ray, North Dakota, has been granted a franchise for the construction of a telephone line connecting Grinnell, Hofflund, Nesson, Ray, Polege and Stordahl.

The Home Telephone Company of Kansas City, Missouri, will vote a bond issue to the amount of $1,500,000 for the purpose of building toll lines through Missouri and Kansas.

The Baltimore & Ohio Railroad Company has completed a private exchange in Cleveland. It has fifty local lines and ten trunk lines and is the largest branch office in the city.

The Plattsmouth (Neb.) Telephone Company has bought the system and franchise of the South Omaha Independent Telephone Company. A new system will be put in at South Omaha.

Telephones have been installed by the Louisville, Kentucky, and Southern Indiana Traction Company at all of its stations and sidings between New Albany and Jeffersonville.

The Citizens' Telephone Company has decided to construct a line from Vermillion, in Edgar county, Illinois, to Dennison, in Clark county, and the work will be begun immediately.

The Atchison (Kan.) Telephone Company (Independent) with 1,100 subscribers and long distance connections, just completed, has offered its services to farmers tributary to the new line.

The grocers of Independence, Missouri, have all agreed to throw out the telephones of the Bell company June 1. The druggists and dry goods men ordered their Bell telephones out May 1.

The liverymen and grocers of Kansas City have followed the example of the druggists and physicians and discarded the Bell service. They will use the Home company's telephones exclusively.

The Home Telephone Company of Lead, South Dakota, which has recently taken over the property and property rights of the old Harrison Telephone Company, has three crews in the field repairing and improving its system. The lines connecting Lead with adjoining towns and communities are receiving new poles and wires, and new plants are

to be introduced in Lead and Deadwood for the central stations.

The J. N. Coulter Construction Company, operating telephone exchanges in the Osage Nation and Indian Territory, has disposed of its property to the Pioneer Telephone Company of Guthrie, Oklahoma.

The Tremont (Ill.) Independent Telephone Company, recently incorporated, has purchased the telephone property formerly owned and operated by A. J. Davis, who has been made president of the company.

An Independent telephone company is being organized at Pottsville, Pennsylvania. The council recently declared the franchise of the existing company forfeited because of alleged violations of its provisions.

The big telephone exchange in the palace of electricity at the St. Louis exposition is in successful operation and a practical demonstration of its workings are given daily. Nearly 1,000 lines are operated.

The New Long Distance Telephone Company of Texarkana, Arkansas, has opened its line to Honey Grove, Texas, a distance of 100 miles. It is stated that a line will be built from Texarkana to Little Rock.

The Citizens' Telephone Company of Grand Rapids, Michigan, has placed an order for 1,000 more telephones to be delivered at once. Since January 1 the company has installed over 1,000 new telephones.

The committee having in charge the Independent telephone interests of the state of Ohio met at Columbus recently and arranged for a state convention to be held in Columbus June 2. An interesting meeting is promised.

The Independent telephone company at New Castle, Indiana, has completed a line to Kennard, which is a link in a direct line to Indianapolis. At present the latter city has to be reached through Knightstown and Greenfield.

Every passenger and freight train that has passed through Augusta, Georgia, for the past seven years has been sent in and out of the Union station and through the corporate limits of the city by the automatic telephone system.

It has been decided to reincorporate the Mount Vernon (O.) Telephone Company under the laws of Ohio and to increase the capital stock from $100,000 to $150,000. Reports show that the company has 1,603 subscribers.

An Independent telephone company is attempting to secure a franchise in Owego, New York, for the purpose of putting in a local exchange in that village and operating a line in opposition to the Bell Telephone Company.

The Thomas-McCoombs telephone plant at Royal Center, Indiana, has been purchased by G. S. Akers of Ambia, Indiana. Mr. Akers announces that he will install a new switchboard and make many other needed improvements.

The Columbus (O.) Automatic Telephone Company is now in full operation. The requisite number of subscribers has been connected and the contractors have turned the exchange over to the Columbus Automatic Telephone Company.

The city council of Spokane, Washington, has granted to the Interstate Telephone Company a franchise to operate in that city. This will complete a circuit giving Spokane telephonic connection with numerous cities in the Panhandle country.

The Atlantic Coast Telephone Company has just moved into its new quarters at Atlantic City, New Jersey, which represent an expenditure of over a quarter million of dollars, the new switchboard alone costing in the neighborhood of $50,000.

The Calhoun County Telephone Company of Battle Creek, Michigan, has been reorganized under the name of the Citizens' Telephone Company. The capital stock will be increased to $100,000. The plant will be bonded for $200,000.

Paul E. De Fere, representing the New York and Long Island Telephone Company, has been granted a franchise by the village board of Babylon, Long Island, permitting his company to come into Babylon by using underground construction.

The National Telephone Company of Coffeyville, Kansas, will install a central energy plant, with a full metallic circuit. A thousand-drop switchboard is part of the equipment. The company also plans to erect a two-story exchange building this summer.

The North Colorado Telephone Company of Greeley, Colorado, has asked the city council of Longmont, Colorado, for a franchise. In case it is not successful the company will ask for a franchise in North Longmont and will install an exchange at that place.

Manager H. W. Wilson of the Farmers' Telephone Company of Lee County, Illinois, reports 600 telephones in service, with four switchboards. The indications are that many extensions will have to be made in the near future to take care of the growing business.

The Citizens' Telephone and Telegraph Company of Kenosha, Wisconsin, has closed a deal for the purchase of the plant and lines of the Pleasant Prairie Telephone Company for $1,600. The Independent company will then control all the rural lines in Kenosha county.

The Citizens' Telephone Company of Kalamazoo, Michigan, which is affiliated with the Jackson and Grand Rapids enterprise, is preparing to spend $80,000 on a new exchange. A bond of $200,000 has been deposited. The automatic exchange system is to be installed.

The Home Telephone Company of Albion, which was recently organized, Rochester and Albion capitalists being interested, has commenced work on its new plant, and is anxious to open the services next July with one of the most modern telephone plants in the United States.

The Olathe (Kan.) Citizens' Telephone Company has been sold to Oscar Ayers of Gardner, Kansas, for $20,000. The sale includes all of the Citizens' Company's lines throughout the country. Connections will be made with the Home Telephone Company of Kansas City.

E. C. Odell, manager of the Independent Mutual Telephone Company of Shenandoah, Iowa, reports 541 city and 400 rural subscribers, with orders coming in for both town and country faster than the company can take care of them, making it necessary to greatly enlarge the service.

The Inter-Ocean Telephone and Telegraph Company, Buffalo, N. Y., reports a marked increase in its long distance business. The company, which now has connection

with about 500 towns and has over 50,000 subscribers, is rapidly extending its lines in Western New York.

The Tri-City Independent Telephone Company of Clinton, Iowa, has increased its capital stock from $135,000 to $600,000. Telephone men in that section of Iowa are of the opinion that it is a forerunner of plans for important consolidations and the extension of long distance copper toll lines.

The Utica (N. Y.) Home Telephone Company opened its exchange April 1, 1903, with 1,300 working telephones, and to-day it has nearly 3,000 in use, also an exchange at Whitesboro, with 158 telephones. The Bell company has reduced its residence rate to $15 per year on a party line to meet competition.

The Farmers' New Era Telephone Company has been organized in McHenry county, Illinois, and will soon begin the construction of a large central exchange at Hebron, sending out several branch lines from that point through the northern part of the county and into a portion of Walworth county, Wisconsin.

All differences between the Citizens' Telephone Company of Racine, Wisconsin, and the Badger Long Distance system, with headquarters at Milwaukee, have been adjusted and in less than six months connections will be made with the local system and systems at Beloit, Janesville, Rockford, Madison and other western cities.

It is reported that the Keystone Telephone Company of Philadelphia, since the first of the year, has installed new telephones to the number of 1,400. The statement is made that the net earnings for the first quarter of the present year will surpass largely those of the corresponding period last year, when the profits were $41,000.

On May 1 the telephone operators employed by the Cuyahoga company at Cleveland, Ohio, received an advance in wages of twenty-five per cent. President Dickson says this is due them for the good service rendered by them and which has enabled the company to increase business. The co-operative plan remains as it was before.

The Sullivan Telephone Company of Sullivan, Indiana, now has nearly 600 subscribers, and when contemplated extensions are made the list will reach over 800. The following towns will be connected: Shelburne, Farmersburg, Hymera, Coalmont, Star City, Cass, Dugger, Oaktown, New Lebanon, Merom, Riverton and Palestine, Ill.

The Mitchell (Ind.) Telephone Company has nearly 500 telephones in use and has begun the reconstruction of its plant. The company is capitalized at $22,000. The stock pays 8 per cent dividend. In order to make some additional improvements $4,000 worth of stock is offered for sale. Exchanges are maintained at Georgia, Huron and Shoals.

None of the ordinary telephone cabinet work used for commercial purposes will be installed in the Chinese government pavilion at the World's Fair. Kee Owyang of the commission has decided that a different sort must be provided. The woodwork of the telephone will be painted red and gold to harmonize with the colors of the pavilion.

The earnings of the People's Telephone Company of Akron, Ohio, for the first quarter of this year were $21,830, as compared with $20,201 for the corresponding time for last year. The net profits for stock are $5,897 and the first three months last year they were $4,980. At this rate the stock is earning six per cent dividend. The company has 3,800 subscribers.

A force of men in the employ of the Home Telephone Company is working in the extreme southern part of Sarpy county, Nebraska, extending that company's line. There are now 450 telephones in operation throughout that vicinity, including the 175 used in Papillion. Many new orders are being filled and by summer there will be 600 telephones in use throughout Sarpy county.

At a recent meeting in Oswego, New York, the board of directors of the Ontario Telephone Company decided to expend a large amount of money in the construction of farmers' lines this summer to secure and construct connection with Rochester, Buffalo, Fair Haven, Williamstown, Wolcott, Sodus and Red Creek. The company has 800 telephones in service in Oswego.

The telephone exchange at Canton, South Dakota, has changed hands, by order of the stockholders. C. B. Kennedy has been elected president, and D. S. Waldo secretary and manager. The company is in first-class condition financially and will make several important improvements in its service during the coming year. Among these will be the extension of its lines to the surrounding country.

Plans are being made for the organization of an Independent telephone company in Albany, New York. At a recent meeting a committee consisting of W. R. Bilyeu, H. H. Hewitt, J. J. Whitney, G. S. Hill, H. Bryant, L. C. Stratton, George Cline, H. D. Burkhart and G. A. McCart was appointed to take any and all action necessary to install an Independent telephone exchange in the city of Albany.

The Ouachita (Ark.) Telephone Company, which is owned by M. A. Joy of Camden, Arkansas, is to be entirely reconstructed with a central energy equipment of from 300 to 500 central energy, visual signal lines, twenty magneto jacks and drops for toll lines, and 300 telephone sets. The construction will include complete new material inside and out with some 10,000 feet of cable twenty-five to 200 pair.

The telephone and electric light men of North Dakota organized at Grand Forks on May 12, and elected the following officers: President, J. F. Leary, Valley City; vice-president, Allen Tompkins, Rugby; secretary, J. S. Fuller, Larimore; treasurer, Thomas Roycraft, Grand Forks. The organization has a good membership and starts with bright prospects. The next meeting will be held in Fargo in October.

The Commercial Union Telephone Company has been organized at Troy, New York, for the purpose of merging the Rensselaer Telephone Company of that city, the Saratoga Telephone & Telegraph Company of Saratoga Springs and the new Union Telephone Company of Glens Falls. The new company elected J. T. Christie, president; W. Levis Burke, secretary, and Peter McCarthy, treasurer. It will extend its lines.

The Inter-State Telephone and Telegraph Company, which is at present putting up a lead of heavy copper toll lines between Chicago and Kansas City, is now within about sixteen miles of Chicago. It is confidently expected that connection will be made with the New Independent company in Chicago not later than the middle of July. The system of through toll lines above referred to will, when completed, enable the local subscribers of the Central Illinois Independent Telephone Company to talk from their homes or places of business with Chicago, Peoria, Springfield, St.

Louis, Kansas City and all cities of moment along the route referred to.

The Lebanon (Ind.) Telephone Company will install a lamp signal board. A chief operator's desk and information bureau has already been installed. There are now over 850 subscribers and a waiting list of over 150. The work of putting up a mile of aerial cable in the business district has been completed, and an additional mile is being strung in the residential districts. These improvements will foot up over $15,000.

A plan for the consolidation of the Hillsboro, Duane, Caledonia and Shelly and the Traill County Telephone system in North Dakota is now practically accomplished. The new order of things is to take effect June 1. Hillsboro will be the center of the new system, which is to be greatly extended in all directions. Both of the old companies have been paying ventures in the past and their consolidation would tend to make them even more profitable.

In Walla Walla, Washington, there are thirteen telephones to each 100 population. This percentage is nearly as large as any city in the country, and is rapidly increasing. At this time the city maintains 1,455 Independent telephones, while in January, 1900, there were but 350 instruments in the entire exchange. To maintain this system and permit people to communicate quickly with each other, thirty-seven people are employed regularly by the company.

Nearly 200 more farmers on the Indiana rural lines have recently been connected by telephone with Elwood, Indiana. One hundred and thirty applications are also waiting to be approved by the telephone company. The Delaware and Madison Counties Telephone Company, the Independent line, is working along the rural lines and five new circuits have been built to meet the demand. Over 400 farm residences are connected with the Elwood exchange.

Charles C. Townsend of Greeley, Colorado, is seeking a franchise for an Independent telephone system in Boulder. Mr. Townsend will furnish a $10,000 bond and will begin work within three months and complete the system within six months. He also states he has no connection with the Independent Telephone Company of Greeley and has stipulated that the franchise be annulled in case the Colorado Bell Telephone Company is interested in any way.

It is said that the Warner Telephone Company, recently organized in Gowanda, New York, with a capital stock of $50,000, will, in the near future, install an up-to-date telephone exchange, which will connect with the long-distance toll lines of the Inter-Ocean Telephone and Telegraph Company for long-distance service; and that it will also build local lines from Gowanda to South Dayton, Silver Creek, North Collins, Cattaraugus, Springville and Arcade.

The telephone question, which has been agitating the St. Paul, Nebraska, public, has been settled. The ordinance granting a franchise to F. J. Bell of Ord and other non-residents under the name of the St. Paul Telephone Company has been indefinitely postponed. This action was taken as the result of a proposition made by the Howard County Telephone Company, in which practically every concession asked for by local subscribers was granted.

It is stated upon reliable authority that the United States Telephone Company will have a line in operation between Dayton and Richmond, Indiana, within two or three months. This will connect the system with the New Long-distance Telephone Company of Indianapolis, and through it with all points in the west and southwest reached by the other long-distance companies that recently entered into an agreement to operate together so far as needed to give good service.

The April directory of the Keystone Telephone Company, Philadelphia, is said to contain the names of some 14,500 subscribers, an increase of 1,500, more than 10 per cent over the January directory. The number of nearby outside connections has also increased about 10 per cent. The Atlantic City line of the company has been opened, making connection with the Atlantic Coast Telephone Company, a subsidiary of the Interstate Telephone Company, which has 1,600 subscribers in Atlantic City.

The Streator (Ill.) Independent Telephone Company now has 1,183 telephones in service. The company made a net increase of over 300 subscribers last year, and so far this year the increase has been over 200 telephones. At least $10,000 will be expended during the year in developing rural lines. Manager Schuler states that at the present rate of increase the company will have over 1,500 telephones in use by the close of the year. The long distance line to Bloomington will be continued to Springfield at once.

The financial success of the long-distance toll lines and system of the Independent Telephone Company of Yankton, South Dakota, has been demonstrated by the payment of a dividend of twelve per cent to the stockholders. The town exchanges and rural lines of the company, as well as its toll lines business, have grown in a most satisfactory manner, and the company will push the extensions of its long distance lines north to Mitchell and through to Sioux Falls and to Sioux City, Iowa, with stations at all of the intermediate towns.

The annual meeting of the stockholders of the Albany (N. Y.) Home Telephone Company was held at the office of the company a short time ago. The affairs of the company are in a very flourishing condition. The annual report shows a net increase of 1,159 telephones for the year, with about 200 contracts on file waiting for installation. New contracts are being received daily. The report also shows that the company, after operating for 15 months, has an earning on stock of 9 per cent after paying for operating, maintenance and all fixed charges.

During the fiscal year just closed the Bureau County Independent Telephone Company has earned sufficient money to pay eight per cent dividend, loan $7,000 to the construction account and in addition to add $1,400 to the fund on hand for the coming year. During the year 600 telephones were added, making an increase in the rental revenue of $8,500. There are now 2,860 telephones in service in the system. Applications are now on file for 150 new telephones, and by midsummer it is expected that 3,000 telephones will be in use in the county.

The city council of Petersboro, Ontario, has granted a franchise to the Canadian Machine Telephone Company, to erect their poles and string the wires necessary for the operation of the Lorimer system of machine operated telephones, the system to be in operation in twelve months, and wires to be placed underground in the principal business streets. The price for business telephones is not to exceed $20 for year, while $15 is the residence price. Business and residence telephones of same subscriber, $30. The system will be maintained and equipped in a modern manner. This is the first town or city in Canada in which this company has made application for a franchise. Work will commence immediately on the installation of the system. The factory of the company is located in Toronto.

IN THE RURAL LINE DISTRICTS

The telephone girl at Blue Rapids is named Alyce.—*Hutchinson (Kan.) News.*

The farmers up Pretty Creek are building a new 'phone line.—*Alma (Kan.) Enterprise.*

The Frog Alley Telephone Co. elected officers Wednesday evening.—*Towanda (Ill.) News.*

Telephones about all out of fix down here.—*Everett Letter in Harrisonville (Mo.) Democrat.*

Most every farmer in Sunflower has a telephone.—*Sunflower Siftings in Sidney (Ia.) Herald.*

Ben Parrish has got a new telephone. He likes to talk.—*Seven Pines Items in Fairmont (W. Va.) Press.*

Telephones are all the talk in the community at present.—*Coal Creek Chips in Emporia (Kan.) Gazette.*

Telephone is the topic at Harmony Hill nowadays.—*Harmony Hill Happenings in Emporia (Kan.) Gazette.*

George Gum has erected a telephone line joining the quarter line.—*Sycamore Siftings in Mt. Vernon (Mo.) Record.*

The city of Zion now has telephone connection with the world. Zion is in Grant county.—*Hutchinson (Kan.) News.*

Telephones, local option and a new court house are all the go in these parts.—*Liberty Items in Bolivar (Mo.) Free Press.*

A new 'phone line has been completed which permits Spring Brook to dabble with Madelia and Riverside.—*St. Paul (Minn.) News.*

John Grab put in three new telephones on this line last Saturday, making twenty-three telephones on the line.—*Westmoreland (Kan.) Recorder.*

We are now hitched up by telephone with Lacon and it is certainly a great convenience.—*Hopewell Correspondence in Lacon (Ill.) Democrat.*

This is the expression on the new telephone line: "Hold on, needn't ring me, I'm here."—*Ten Mile Correspondence in Macon (Mo.) Democrat.*

About sixty new telephones will be put in this division. Wires are strung from all directions and they make us look kind o' cityfied.—*Ashland (O.) Press.*

The telephone poles will be set between Laddonia and Mexico by Saturday night. J. N. Rosser is pushing the work.—*Rush Hill Items in Mexico (Mo.) Ledger.*

Samuel Wardlow and lady are enjoying the use of their up-to-date telephone recently added to their cozy home.—*East End Etchings in Lancaster (Mo.) Republican.*

Telephone talk is all the go here at present, the line being completed between this place and Mossyrock.—*Silver Creek Scintillations in Challis (Wash.) Bee-Nugget.*

Miss Lizzie Thompson departed Friday for California. Some of the boys are looking blue, especially Madisonville's telephone operator.—*Jasper Jottings in Vandalia (Mo.) Express.*

Mrs. Will Rhodes visited with Mrs. House Friday while Will helped order the 'phone material, after which they both left for the sale at Hope.—*Kamona Notes in Marion (Kan.) Record.*

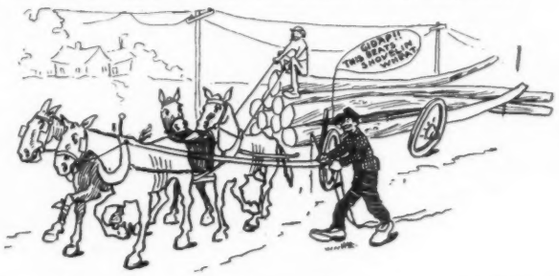
The Slippery Elm telephone line and the Bell line were connected all day Tuesday and Mrs. Lou Turner talked from her own home to central in both Omaha and Grand Island.—*Slippery Elm Items in Bradshaw (Neb.) Republican.*

The opening of the new telephone line at Ten Mile was celebrated with graphophone, violin, banjo, French harp, guitar and organ Friday night.—*Macon (Mo.) Democrat.*

M. J. Stedje is going to erect a telephone line. He says it will save considerable shoe leather.—*Viking Voices in Lake Mills (Ia.) Graphic.*

Two more 'phones have been put in: one at Mr. Becker's and the other at Mr. Taylor's. They are talking of running the line on to Sparks.—*Valentine (Neb.) Democrat.*

The folks here expect to have the telephone line completed ere long, which will be a source of pleasure and profit combined.—*Upper Boxelder Brevities in Fort Collins (Col.) Express.*



We are glad to note that Alonzo Todd, who until about a year ago was in the employ of the Central Granary Co., but now of the Crab Orchard Telephone Co., has been promoted, being now head teamster, at an advanced salary.—*Crab Orchard (Neb.) Herald.*

Telephones are as common here as thunder storms after night. Everybody around here has a telephone except Bill Drake, Bob Shirley and Frank Samuels.—*Salem Letter to Franklin (Ind.) Democrat.*

Deafy Boler has had a telephone put in.—*Atchison (Kan.) Globe.*

A. Norlin, the telephone man from Alma, passed Templin looking over the lines Monday.—*Templin Correspondence in Alma (Kan.) Enterprise.*

Telephone communication with Bloomfield is very bad at this writing; have to wait for Uncle Sam's mail to bring us news from the metropolis of the Hairy Nation.—*West Grove Whispers in Bloomfield (Ia.) Democrat.*

The company controlling the long distance telephone along the Iron Mountain Railroad has put in a 'phone at Neelyville, in Mr. Barnhill's store; for what there is in it, we are informed.—*New Hope Notes in Poplar Bluff (Mo.) Republican.*

Juniata is to have telephone service, so they say. Us fellows who live on the divide offer an amendment to the effect that the Juniata and Kenesaw companies combine, as it cuts our community in two.—*Mt. Zion Echoes in Hastings (Neb.) Democrat.*

The rural telephone line was favored with the pleasure of listening to Pierson's band play over the line Friday evening, which was a rare treat. Mr. Pierson has a telephone put in and now we hope to hear the band occasionally.—*New Hampton (Ia.) Gazette.*

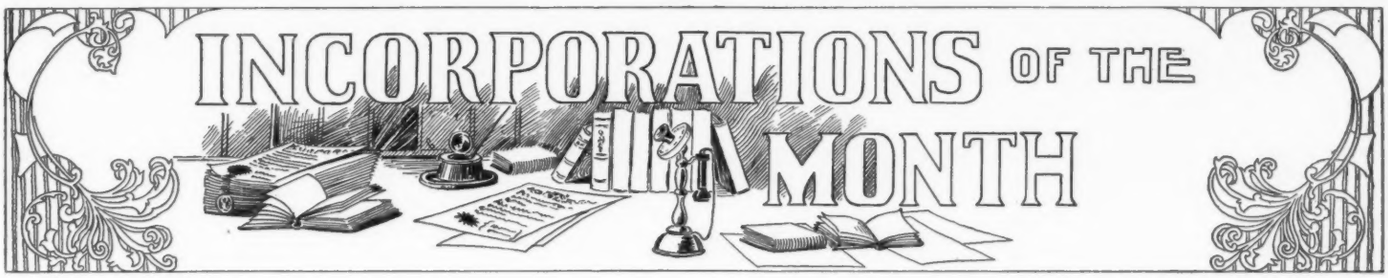
The western part of Pohocco is connected to a telephone system at last The poles were set last fall and all these months the people were wishing they could kill some time over the wires, and it came at last.—*Pohocco Pointers in Fremont (Neb.) Republican.*

The Tuscola Telephone Company is putting up its cable this week. The new bells will be tinkling soon and there will be two chances to talk instead of one then. We'll all have a chance to do more gossiping when we have another line.—*Tuscola (Ill.) Review.*

We are informed the Country Telephone Company is having a new switchboard put in place with all the modern improvements. So if Weston gets a coal shaft, a farmers' elevator, she will be on the boom sure.—*Weston Correspondence in Fairbury (Ill.) Record.*

There is talk of organizing a home telephone company in Blackburn. This is a move in the right direction. If Blackburn expects to keep up with the procession she will have to put telephones in or be relegated to the class of villages and of having a class of business men with no "get up and get there" about them.—*Blackburn (Mo.) Record.*

The latest enterprise we can boast of in this hamlet is a telephone, known as the Devendorf line, with its eastern terminus at Cold Spring Farm operated by Mr. Hiram Van Buren and family, who have a 'phone in their residence. May these blessings continue to come, and quoting an old-time poet, we say, "Lay on, lay on, McDuff! and accursed be the man who cries enough!"—*Jacksonburg Letter in Herkimer (N. Y.) Democrat.*



CANADA.

Markdale, Ont.—East Grey Telephone Company. Capital stock $7,000. Directors, Christopher Knott, James Fawcett, J. W. Ford, Walter Turner, W. J. Shortell.

CALIFORNIA.

San Bernandino—United States Long Distance Telephone Company. Capital stock, $3,000,000. Directors, C. A. Gates, A. F. Morlan, D. J. Maguire and others.

GEORGIA.

West Point—West Point and Chipley Telephone Company, organized. President, W. N. Maddox; secretary, Trox Bankston.

IOWA.

Elkhart—Elkhart Mutual Telephone Company. Capital stock, $10,000.

Waukon—Paint Creek Telephone Company. Capital stock, $15,000. President, Wm. Rood.

College Springs—College Springs Telephone Company. Incorporators, O. Slough and others.

Sully—Sully Mutual Telephone Association. Capital stock $7,000. Incorporators, J. P. Taylor and others.

Milo—Plainville and Rosemount Telephone Company. Capital stock $1,000. Incorporators, F. A. Walk and others.

Sanborn—The Floyd Valley Rural Telephone Company. Capital stock, $1,000. Incorporators, N. S. Miller, P. H. Miller, Wm. Clarksen, George Dummett, J. H. Greet, J. J. Getting.

West Union—Rogers Telephone Company, organized. Capital stock, $25,000.

Bonaparte—Farmers' Telephone Company.

Sutherland—North Central Telephone and Telegraph Company. Capital stock, $10,000.

Kendallville—Kendallville and Burr Oak Telephone Company. Capital stock, $400. Incorporators, Thos. Fleming and others.

INDIANA.

Monroe—Monroe Mutual Telephone Company. Capital stock, $2,250.

Spencer—Owen County Telephone Company. Capital stock $10,000. Directors, E. F. White, Philip Hauser, S. H. Alverson.

Gosport—Farmers' Mutual Telephone Association. Capital stock, $1,000. Incorporators, John S. Snodgrass, Philip Hauser.

Bloomington—Bloomington Home Telephone Company. Capital stock, $150,000. Directors, J. D. Showers, W. D. Bradfute, E. L. Barber, Q. C. Monteith.

Elwood R. F. D.—Leisure Telephone Company. Capital stock, $3,500. Directors, Arthur L. Hiatt, David T. Hutcherson, David S. Wadswell, Frank Smith and William Steel.

Flora—Flora and Bringhurst Co-operative Telephone Company, organized. President, Dr. W. E. Callane; vice-president and general manager, E. E Eikenberry; secretary, A. G. Crosswhite; treasurer, J. H. Coplen.

Sullivan—Sullivan Telephone Company. Capital stock, $50,000. President, C. J. Sherman; secretary, J. S. Bays; treasurer, G. R. Dutton; manager, E. L. Hardin.

Noblesville—Baton Rouge Telephone Company. Capital stock, $2,000. Directors, C. D. Zimmer, J. W. Aldred, S. Morrison.

Evansville—Citizens' Telephone Company. Capital stock, $100,000. Incorporators, A. F. Karges, W. J. Wood, M. L. H. Johnson, A. P. Lahr, Capt. Lee Howell, D. S. Ragon, M. S. Sonntag, S. Henrich, G. A. Cunningham.

Stendal—Stendal Home Telephone Company. Capital stock, $1,000. Directors, John W. Stillwell, F. W. H. Schumaker, William H. Ellert, W. F. Burke, N. W. Teraulte.

ILLINOIS.

Evansville—Evansville Telephone Company. Capital stock, $2,500.

Hebron—Farmers' New Era Telephone Company, organized. President, George A. Hunt; vice-president, D. M. Weter; secretary, P. J. Weter; treasurer, F. N. Torrence; general manager, C. C. Hunt.

Galesburg—Oak Grove Telephone Company. Capital stock, $500. Incorporators, Thos. R. Castle, Ellery Stegall, Herbert E. Griffith.

KANSAS.

Pleasanton—Consolidated Telephone Company. Capital stock, $30,000.

Walsburg—Riley County Mutual Telephone Company. Capital stock, $1,000.

Potwin—Potwin Mutual Telephone Company. Capital stock, $15,000.

Agra—People's Telephone Company. Capital stock, $5,000.

Mound City—Mound City Telephone Company. Capital stock, $4,000.

Linn—Linn Rural Telephone Company. Capital stock, $5,000. President, R. W. Mainty; vice-president, F. J. Randall; secretary and manager, H. J. Meierkord.

Narka—Ida Mutual Telephone Company. Capital stock, $1,000.

Glen Elder—Blue Hill Telephone Company. Capital stock, $2,500.

KENTUCKY.

Deatsville—Deatsville and Solitude Telephone Company. Capital stock, $300.

MAINE.

Centre Lincolnsville—The Centre Lincolnsville Telephone Company. Capital stock, $1,500. Incorporators, J. S. Mullin, N. D. Ross.

Mercer—People's Telephone Company. Capital stock, $2,700. Incorporators, C. K. Allen, N. E. True.

MICHIGAN.

Morrice—Farmers' Union Telephone Company.

Stockbridge—Mutual Telephone Company of Stockbridge.

Billings—Billings Telephone Company, organized. President, Geo. Kent; secretary, Marshall Kent; treasurer, James Spence.

MINNESOTA.

Rice Lake—Clark and Foster Telephone Company. President, August Miller.

Osseo—Rural Telephone Company. Capital stock, $50,000. Incorporators, Henry Berning, P. F. Heckelmann, H. E. Hunt, Eden Schmidt, Elmer Owen, A. P. Hechtman, B. V. Dibb, R. F. Goetz, C. E. Evans.

MISSISSIPPI.

Taylorsville—The Smith County Telephone Company, organized. Capital stock, $5,000.

MISSOURI.

Oregon—Oregon and Forest City Telephone Company. Capital stock, $10,000. President, D. H. Martin; secretary, treasurer and manager, M. R. Martin.

St. Louis—Hutchinson Wireless Telephone Concession Company. Capital stock, $3,000. Incorporators, M. R. Hutchins, Hallon C. Spaulding, Boston; Edward C. Husted, St. Louis; L. Z. Harrison, St. Louis.

NEBRASKA.

Hardy—Hardy Telephone Company. Capital stock, $10,000.

Arapahoe—Arapahoe Telephone Company. Capital stock, $20,000.

Hamlin—Hamlin Rural Telephone Company. Capital stock, $5,000.

Wolbach—Greeley County Telephone Company. Capital stock, $10,000.

Chapman—Chapman Telephone Association. Capital stock, $50,000.

Valentine—Stockton Telephone Company. Capital stock, $10,000. Incorporators, C. S. Reese and others.

Ashland—Ashland Telephone Company. Capital stock, $50,000.

INDIANOLA—Havana Telephone Company. Capital stock, $15,000.
INDIANOLA — Indianola Telephone Exchange. Capital stock, $10,000.

NEW JERSEY.

JERSEY CITY—Tape Transmitter Manufacturing Company. Capital stock, $100,000. Incorporators, Edward T. Clarke, 13 Bentley ave., Jersey City; Elihu J. Beach, 231 West 116th st., New York City; Loyal Ward Reynolds, 2649 Eighth ave., New York City.

NEW YORK.

RAVENA—The Ravena and Medway Telephone Company. Capital stock, $5,000. Directors, William C. Harden and Ernest Bilz, Stanton Hill; Harry Thorne, New Baltimore; Clifton Bedell, Aquetuck; E. L. Haight, Arthur Hartz, Frederick C. Bush and Clarence E. Whitney, Ravena; Harrie McCurtis, Coxsackie.

WALTON—Delavan Telephone Company. Capital stock, $3,000. Directors, Grant Wilson, I. L. Brayman, Thomas Carey.

HOOSICK FALLS—Farmers' Telephone Company. Capital stock, $5,000. Incorporators, Jay C. Cottrell, Perry S. Pine and John B. Hill.

NORTH COLLINS—North Collins Telephone Company. Capital stock, $5,000. Directors, W. M. Ward, D. A. Dillingham, H. G. Parker.

KEESEVILLE — Keeseville Telephone Company. Capital stock, $20,000. Incorporators, J. H. A. Bond, J. B. Mace and W. C. Palmer, Keeseville, N. Y.

CAIRO—Round Top, Purling and Cairo Telephone Company. Capital stock, $400. Incorporators, William L. Richards, Joseph Richards, James B. Edgerly.

SYRACUSE—Northern Union Telephone Company. Capital stock, $50,000. Directors, William M. Booth, A. B. Thompson, Raymond L. Skinner, C. J. Skinner, Frank B. Howard, Dr. D. W. Bull, L. W. Emerick.

COOPERSTOWN—Otsego Home Telephone Company. Capital stock, $40,000. Directors, Frederic C. Ward and Agnes A. Ward, Cooperstown; H. A. Harrison and Delia D. Harrison, New York City; T. Harvey Ferris, William M. Foley and Clarence O. Putnam, Utica.

NORTH CAROLINA.

MARS HILL—Ivey Telephone and Telegraph Company. Capital stock, $125,000.

WADESBORO—Rocky River Springs Telephone Company, organized. Capital stock, $25,000. President, G. Huntley; vice-president, H. Haynie; secretary and treasurer, T. J. Gaydle.

OHIO.

MT. VERNON—Mt. Vernon Telephone Company. Capital stock, $150,000. Incorporators, Walter Curtis, John E. Russell, O. M. Arnold, E. W. Bruce.

PERRY—Perry Telephone Company. Capital stock, $10,000. Incorporators, J. H. Brown, W. W. Cook, F. G. Salkheld, O. O. Hansck, W. R. Child.

ALVORDTON—Alvordton Telephone Company. Capital stock $10,000. Incorporators, A. L. Biglow, D. C. Lord, C. F. Poulson, P. C. Biglow, V. E. Cunningham.

SUMMERFIELD—Summerfield Telephone Company. Capital stock, $5,000. Incorporators, J. H. Sparling, E. S. Wilson, J. A. Lennox, C. H. Dew, V. K. Herlan, William Simmons, H. R. McClintock.

TOLEDO—Toledo Construction Company. Capital stock, $100,000. Incorporators, Ed L. Barber, J. S. Brailey, Jr., James E. Brailey, Herbert D. Barber, James C. King.

FULTON—Fulton Telephone Company. Capital stock, $5,000. Incorporators, E. E. Jackson and Chas. Feldon.

MANCHESTER—Brown Telephone Company. Capital stock, $20,000. Incorporators, O. E. Bare and others.

OKLAHOMA.

ENID—Garland Mutual Telephone Company. Directors, W. T. Russell, R. H. Smith and H. C. Davis.

MORRISON—Perryman Telephone Company. Capital stock, $2,000. Incorporators, James T. Perryman, James P. Woolsey of Perry.

BLACKBURN — Blackburn Telephone Company. Capital stock, $5,000. Incorporators, W. T. Litton, I. M. Seipp, W. E. Ready, G. H. Schultz, Blackburn; J. B. Meyer, W. M. Ware, F. R. Turner, A. F. Meyers, Cleveland.

OREGON.

WILLAMETTE—W. W. Telephone Company. Capital stock, $10,000. Incorporators, C. G. Huntlet, G. H. Rogers, C. Baker.

BAKER CITY—Snake River Telegraph and Telephone Company. Incorporators, Colonel J. H. Aitkin, Victor Greensdale, A. W. Sutherland.

PENNSYLVANIA.

PHOENIXVILLE—Phoenixville Telephone Company organized.

SOUTH DAKOTA.

ALPENA—Alpena Telephone Company. Capital stock, $5,000.
CANTON—Mutual Telephone Company. Capital stock, $20,000.
PIERRE—Eldon Home Telephone Company. Capital stock, $50,000.

TENNESSEE.

LEBANON—Independence Telephone Company. Capital stock, $10,000. Incorporators, W. C. Arrington, J. P. Belcher, H. R. Bryan, D. E. Seay, C. B. Murphy.

TEXAS.

HOUSTON—Phœnix Telegraph and Telephone Company. Capital stock, $25,000. Incorporators, J. M. Smith, Lorenzo Hills, A. L. Hills.

SHOP SPRINGS—Linwood Telephone Company. Capital stock, $1,000. Incorporators, H. D. Beadle, W. W. Young, J. W. Andrews, A. A. McNabb, T. M. Turner, O. D. Hearn.

VIRGINIA.

SUSSEX—The Sussex and South Side Telephone and Telegraph Company. Capital stock, $5,000.

BLAND—Bland Telephone Company. Capital stock, $600 to $5,000. President, Fuller Kegley.

WASHINGTON.

ROCKFORD—Rockford Telephone Company, organized. President, C. S. Shepard; vice-president, G. Saunders; secretary, Pat Sullivan.

PORT TOWNSEND—Citizens' Telephone Company. Capital stock, $10,000.

WEST VIRGINIA.

DRY FORK—Dry Fork Telephone Company. Capital stock, $10,000. Incorporators, J. A. Hardy, J. E. Anville, B. F. Williams, A. J. Lib, R. R. Smith.

WISCONSIN.

GRAND RAPIDS—Cranmoor Telephone Company. Capital stock, $2,000. Incorporators, John A. Gaynor, George W. Paulus, George M. Hill, Melvin O. Potter, John B. Arpin, A. E. Bennett.

ALMA—Tenney Telephone Company. Capital stock, $2,000. Incorporators, Jacob S. Tenney, John T. Tenney, Jacob Accola, Valentine Thoeny.

ELMWOOD—Highland Telephone Company. Capital stock, $1,000. Incorporators, H. A. Miles, W. H. Young, Hugh Bell, Ira J. Smith, William Fensenmaier.

SWISS—St. Croix Mutual Telephone Company, organized. President, C. H. Chipman; vice-president, C. F. Helwig; secretary, J. V. Carter; treasurer, H. B. Dunn; trustees, Richard Goldschmidt, Joseph Wierschem, L. T. Fournier.

BROWN—The Anson and Acasto Telephone Company has elected the following officers: President, David Rider; secretary, Frank P. Greenlief; treasurer, Martin J. Bougher; directors, Jefferson Sutton, Charles H. Harr.

MINERAL POINT—Duke's Prairie Telephone Company. Capital stock, $5,000. Incorporators, Charles Collicutt, James M. Pile, Joseph Whitford, William Harford.

ANNUAL MEETINGS.

ARKANSAS.

DARDANELLE—Arkansas Telephone Company. Capital stock, $50,000. President and treasurer, Jno. B. Crownover; vice-president and manager, W. R. Hayen; secretary, A. L. Blackwell; directors, A. D. Perry and C. W. Brown.

COLORADO.

GREELEY—The Morgan County Independent Telephone Company has elected the following officers: President, W. H. Clatworthy, Ft. Morgan; vice-president, C. C. Townsend; secretary, R. M. Handy, Ft. Morgan; general manager, L. C. Stephenson; treasurer, Arthur Hotchkiss.

NEWCASTLE — The Garfield County Telephone Company has elected the following officers: President, William Chadwick; vice-president, F. E. Clarkson; secretary, W. D. Lockard; treasurer, J. A. McRae; general manager, J. S. Cass.

IOWA.

FONDA—The Northern Telephone Company has elected officers as follows: President, L. S. Straight; vice-president, L. A. Rothe; secretary, M. G. Coleman; treasurer, A. S. Wood; director, George Sanborn.

SLOAN—The Sloan Telephone Company has elected the following officers: President, W. D. Buckley; vice-president, G. D. Montross; secretary, A. L. Calderhead; treasurer, F. O. Headlee; director, J. M. Whitten.

SOUTH ENGLISH—The Keokuk County Mutual Telephone Company has elected the following officers for the ensuing year: President, Adam Brower; vice-president, Will Groves; treasurer, Theodore White; secretary, Chester Mendenhall.